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The Environment Information System (ENVIS) Centre at Wildlife Institute of India, set up in September 1997, is part of the ENVIS set-up of the Ministry of Environment and Forests, Government of India. It deals with general matters concerning "wildlife" and specifically those related to "protected areas". Its objectives are to :

* Establish a data bank on information related to wildlife and wildlife protected areas, and thereby build up a repository and dissemination centre for information on wildlife science;

* Promote national and international cooperation, and exchange of wildlife related information;

* Provide decision makers at the apex level with information related to conservation and development.

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Dear Reader,

WE FEEL EXTREMELY HAPPY to present the second issue of ENVIS (Wildlife & Protected Areas) bulletin. The overwhelming response to the first issue, on the elephant, has encouraged us to increase the print run for the current issue. We are also happy to inform that the ENVIS bulletin has been placed on the Internet and is available at the website www.wii.gov.in; and any relevant information or comment provided by you on the previous or the present issue will be suitably incorporated in that edition which would be updated periodically.

1998 is the International Year of the Tiger. While we pay our homage to this great and magnificent animal, for this bulletin we decided to rather not talk about the tiger nor in fact about the bigger cats, but instead concentrate on the smaller cats. Indeed, a large portion of the feline conservation attention has been cornered by large cats, while the small and medium cats have not received their due, both in terms of research studies and by way of conservation management efforts. The small cats have also been at times wrongly termed as the "lesser" cats. While they are the lesser known, alright, they are no less than the large cats. Of the 15 cat species found in India, as many as 11 are small. And so, this second issue of ENVIS is devoted to the "small cats of India", all of which, with the exception of the Jungle cat, are threatened or endangered, and demand urgent conservation attention.

This bulletin provides information on the various small cats found in India, their distribution pattern and their status in a few of the states in the country. Undoubtedly, the information provided is not exhaustive; in fact, it is inadequate and only reflects the lack of material available on and attention accorded to these small cats. The response to our requests for papers and articles was poor, but not unexpected, and only underlines the need to pay greater conservation attention to these smaller cousins of the tiger. Hopefully, this modest attempt to focus on the smaller cats will provide a lead in that direction.

Just as hopefully, we are looking ahead to the ENVIS bulletin growing to become a repository of researched and collated information on the various aspects of wildlife and protected areas conservation. In the year ahead, we plan to have our next issues on "Crocodiles" (June 1999). Your participation, by way of papers, articles, notes and information on the subjects is solicited and considered vital for the growth of the ENVIS itself. Please feel free to discuss with us and send your contributions latest upto two months before the due publication dates.

SK Mukherjee

Mailbag

The ENVIS bulletin is excellent. I especially liked your idea of a subject-oriented bulletin. The issue on elephant is an extremely important document and I am sure with the extensive bibliography, the bulletin will be valuable for elephant researchers and conservationists.

- **Asad R Rahmani**, Director
Bombay Natural History Society
Hornbill House, Dr Salim Ali Chowk
Shaheed Bhagat Singh Road
Mumbai 400 023

*

Your issue of ENVIS on elephant is really classic. Congratulations.

- **Sally Walker**, Secretary
Zoo Outreach Organisation
Box 1683, Peelamedu,
Coimbatore 641 004 (Tamil Nadu)

*

We found the bulletin informative and useful. It contains valuable information of use to wildlife community.

- **Ashok Kumar**, Vice President
Wildlife Protection Society
Thapar House, 124 Janpath
New Delhi 110 001

*

The content and layout of the bulletin is excellent and presents a valuable information on Elephant reserves in India.

- **KS Rao**, Scientist Incharge ENVIS
GB Pant Institute of Himalayan
Environment and Development
Kosi - Katarmal, Almora 263 643 (UP)

It will be useful if the contents of ENVIS are abstracted in CAB, FAO, International Abstracts, Current Contents & other Abstracting Journals & Computer networks.

- **Dr AK Chakravorty**
Bangalore (Karnataka)

*

The contents of ENVIS are very informative. I wonder if it will be possible to include some photographs in the future issues.

- **CL Bhatia**
143, Uday Park, New Delhi 110 049

*

Last, but not least ...

It is a well brought out Bulletin but some more attention to detail would have been useful.

- **JCDaniel**, Honorary Secretary
Bombay Natural History Society
Hornbill House, Dr. Salim Ali Chowk
Shaheed Bhagat Singh Road
Mumbai 400 023

The letters have been edited.
- Editor

Corrigendum

Issue Vol 1, No 1; April 1998

1) Pg 23, para Elephant population
".... the elephant population in
Rajaji is 263 as follows...."
Read as, "...263 elephants in Rajaji
have been classified, as follows..."

2) Pg 39, para Elephant population
In the table, the total is given as
256.
Read figure as, 1939.

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Conserving the smaller cats

Peter Jackson

THERE ARE A FEW places in India where you may see tigers; in one place you can see lions; but where can you go to see India's 11 smaller cats? Except for lions and cheetahs, cats are generally extremely secretive as they go about their lives. Seeing tigers, as we do today in Ranthambhore, Bandhavgarh, Kanha and Corbett, is actually quite remarkable, for they are renowned for their ability to remain unseen. Hunters and biologists relate how seldom they have seen tigers. Only in the past 20 years have some appeared calmly in the open in human presence, as a result of the protection provided by Project Tiger and the dedicated work of field staff who daily track the big cats. If tigers as well as leopards and snow leopards are so expert at evading observation, despite their size, what hope is there of spotting a smaller cat?

Who would think of looking in a house? That is where Rusty spotted cats and Jungle cats have been found. But, in general, the cats live in forests, and in grasslands with some bush to provide cover. Protected areas are important as reservoirs of natural habitat, but the smaller cats are able to make use of small amounts of cover and are able to live over a much wider area, away from protected reserves, than the big cats.

India is a meeting point for species of three regions. To the west, lie arid and semi-arid lands, stretching to

Arabia and through North Africa, from which the ranges of species such as the lion and Caracal (and formerly the cheetah) extend into India. To the north, lie the Tibetan plateau and central Asia, strongholds of the Lynx, the Manul (or Pallas cat) and the Steppe wildcat, which cross into India. To the east, the tropical forests of south-east Asia are the principal homes of Clouded leopard, Leopard cat, Marbled cat and Golden cat, which are also found in the forests of north-eastern India. A semi-indigenous species is the Rusty spotted cat which is found only in India and Sri Lanka.

The following are the small cat species, with brief description, found in India :

Genera : *Felis*

JUNGLE CAT (*Felis chaus*)

The name Jungle cat is something of a misnomer, for, in the Indian subcontinent and as far west as Israel, Jordan and the Nile Valley, this species is especially associated with water and dense vegetation, such as swamps and river banks, giving rise to its alternative name "swamp cat". In south-east Asia, it ranges from Myanmar to Vietnam (but not south of the Isthmus of Kra into Malaysia), and is found mainly in tropical deciduous forests. There are records of the Jungle cat as high as 2400m. in the Himalaya and 1000m. in the

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Chairman, IUCN Cat Specialist Group

Caucasus. The cat also thrives in cultivated landscapes, especially where there are plenty of rodents.

DESERT CAT (*Felis silvestris ornata*)

The range of the Desert cat, elsewhere known as the Steppe wildcat, is mainly in the central Asia. In India, it is found only in the extreme west - in Rajasthan and Gujarat. Scrub desert is a preferred habitat, where it feeds on rodents and other small animals, including insects, lizards and snakes.

Genera : *Prionailurus*

LEOPARD CAT (*Prionailurus bengalensis*)

This is especially numerous in China, where its population has been estimated at 20,00,000. However, it has been heavily exploited there for pelt. In India, Myanmar and Thailand, it is threatened and is listed in Appendix I of CITES, which bans all international trade in this species.

FISHING CAT (*Prionailurus viverrinus*)

This species too is considered threatened, especially in its limited range in northern India and the south-west coast of Kerala and Karnataka, where its wetland habitats have been destroyed or degraded. It is feared extinct in the latter region. However, it has been found around fishponds in West Bengal, despite a dense human population.

RUSTY SPOTTED CAT
(*Prionailurus rubiginosus*)

The Rusty spotted cat remains a mystery. Its range was considered to be confined to south-western India, but few records existed. In 1975, a specimen was collected by the Zoological Survey of India in Udampur (Jammu & Kashmir), far north of the accepted range. Another,

a pet specimen in Orissa was said to have been collected in Tuluka reserve forests, Angul district, but there was doubt about the reliability of the record. However, recently, two kittens were found in Daringbadi Block, Phulbani district, which indicates that its known range should be extended eastward deep into Orissa. The species was first photographed in 1990 in the Gir Lion wildlife sanctuary, where it was not previously known to occur.

In the past, it was thought that Rusty spotted cat in India favoured grasslands, scrub and forest, while, in Sri Lanka, it was considered a forest resident ranging up to 2135m. in Horton Plains. But Rusty spotted cats were found in house attics near Cochin (Kerala), well away from forest, and also in a house in the Vansda national park (Gujarat)! One was run over by a car on the outskirts of Mumbai. Other sightings have occurred in the Panna district, Madhya Pradesh.

Genera : *Lynx*

EURASIAN LYNX (*Lynx lynx*)

This cat appears in India only in the far north, bordering Tibet. Its recent records are only from Ladakh, where the species may not survive for long.

Genera : *Otocolobus*

PALLAS CAT (*Otocolobus manul*)

Like the Lynx, Pallas cat or Manul lives mainly in central Asia, and its range only touches the northern fringe of India. However, there are no recent records. These cats survive in extremely low temperatures and snow. Their thick fur led to their once being thought to be the ancestor of the domestic Persian cat. However, that is now discounted.

Genera : *Caracal*

CARACAL (*Caracal caracal*)

A cat of the arid and semi-arid lands, Caracal is found in India from Rajasthan and Gujarat in the west to Madhya Pradesh, but there are few records. It has been sighted in Sariska and Ranthambhore tiger reserves.

Genera : *Neofelis*, *Catopuma* and *Pardofelis*

The primary habitats of CLOUDED LEOPARD (*Neofelis nebulosa*) and small MARBLED CAT (*Pardofelis marmorata*), which have similar coat patterns, as well as the GOLDEN CAT (*Catopuma temmincki*), are in south-east Asia and China. But their ranges include the dense forests of north-east India, and extend into Bhutan and Nepal.

A Clouded leopard was found in the bathroom of a house near Buxa tiger reserve and later released into the forest, and another in a garage in Pokhara, Nepal. Although usually said to be inhabitants of pristine forests, two were captured in degraded forests around Chitwan national park, and later released.

Leopard cat, Marbled cat and Golden cat have all been recorded in Namdapha tiger reserve (Arunachal Pradesh), Manas tiger reserve (Assam) and Balphakram national park (Meghalaya).

Almost all these cat species are up against odds. The fur trade is a serious threat to the smaller cats, especially those with attractively marked pelts, such as the Clouded leopard, Lynx, Leopard cat, Marbled cat, Fishing cat and Rusty spotted cat in India, and the South American spotted species. The Convention on International Trade in Endangered

Species of Wild Fauna and Flora (CITES), together with campaigns by conservationists, has been effective in ending the formerly devastating international trade in skins of threatened spotted cats. Nevertheless, small scale trade continues, usually 'under the counter', and particularly in tourist areas. Seizures of large numbers of skins in various places in India from time to time are evidence of this clandestine trade.

There are other aspects to consider as well. The small cats may prey on small animals such as chickens, rabbits and small goats. Heavy losses, as when a cat kills a large number of chickens in a henhouse or other small livestock can be catastrophic for poor families, as these represents for many people their personal or family wealth and support for life. As such, it is understandable if the humans retaliate and destroy the predators that threaten their livelihood. But whereas compensation schemes are generally provided for losses of large livestock in order to encourage the owner not to kill the predator, none exist for small stock. There is little that can be done to improve the situation, beyond encouraging small livestock owners to take better precautions.

WHY CONSERVE SMALL CATS

If the small cats are sometimes pests, then why conserve them?

There is a very weighty reason: why we must. The principal prey of the small cats consists of rodents, rats, mice and squirrels, which, all over the world, feast on human food supplies, from seeds to fruit. In India, a very substantial percentage of grain production, which could feed a large number of people, is lost to rodents

The wildcats must have chosen themselves to live close to human habitation because of the abundance of their natural prey, and people noted that their presence was useful in killing rodents and protecting their grain stocks. Out of the close association, the wildcat was adopted as a companion of the human family.

Domesticated, the cat is still a natural hunter of rodents and other small creatures, which feed on human food stocks. European farmers benefit from colonies of feral cats around their barns, and a "good mouser" is treasured in the house. Such stray cats are performing a great service to humanity at virtually no cost.

every year. Protected storage is costly and seldom completely effective.

Furthermore, rodents cause considerable damage to the grazing land. Farmers and agricultural authorities in many countries spend large amount of money and time combatting them. They also spread disease among livestock and humans, including bubonic plague, which still exists in parts of India.

Clearly, smaller cats, as well as other small carnivores, such as foxes, mongooses, civets and weasels, which are also persecuted for livestock predation, have a heavy impact on rodent pests and should be encouraged in the human interest.

CONSERVING SMALL CATS

Given the secrecy of their lives, and the few records confirming their presence in various areas, planning conservation measures for the small cats presents considerable difficulty. Moreover, since they lack the glamour of the big cats, it is difficult to persuade governments to set aside

areas only for the smaller cats. However, they share the habitats of the big cats, and like their bigger cousins, their real habitats are natural areas of forest, grasslands and wetlands. Protection of these ecosystems is therefore an essential element in ensuring the smaller cats' future. Protection for the big cats will benefit the small ones too.

CONCLUSION

Yes, the smaller cats can be a problem when they take someone's chickens - and one should sympathise with the losing owner - but the benefits they bestow on us by consuming pests are overwhelming. Furthermore, they are some of the most beautiful and attractive of all the wild species which inhabit the world. We seldom, if ever, see them, but they are there, and we should ensure that they survive.

Selected reading

NOWELL, K. and P. JACKSON (1996) - Wild cats: Status survey and conservation action plan. IUCN Gland, Switzerland.

Cats : Some large, many small

Shomita Mukherjee

TAXONOMY PLACES the cats in three lineages (pantherine, ocelot and domestic cat) and 17 genera. However, they can broadly be divided into *large, medium and small* on basis of their body size. Of the 36 species of cats worldwide, 15 are found in India. Of these, four are large ones (lion, tiger, leopard and snow leopard), but as many as 11 are small and medium cats, weighing less than 25 kg.

A feline can be easily recognized by its appearance and gait, irrespective of size. Huge eyes, a short flat face, supple spine and retractile claws (with an exception - the cheetah) describes a cat. In behaviour too, cats are typical: secretive, largely nocturnal (with a few exceptions), solitary (again with an exception - the lion) and mostly uncommon. All these physical, morphological and behavioural traits make the cat a 'supreme predator'.

A look at the distribution of the small cats (Table 1) shows an almost equal number inhabiting dry open and wet dense areas. This does not mean that the species inhabiting forested areas or those occurring in open areas do not occur elsewhere, but they simply occur in fewer numbers outside their main distribution zone e.g. the Jungle cat mainly inhabits the more open areas, but it is also found in some forested areas though in lower densities.

There are detailed accounts of the small cats provided in some books (Prater, 1965 ; Kitchener, 1991 ; Nowell and Jackson, 1996) and most of our knowledge on their ecology and food habits has come from these studies. However, most of these studies on the small felids have been conducted outside India and there is a large void in information available on all small cats in India, including the relatively more common Jungle cat.

Given below is a very general information on the distribution, behaviour and ecology of the small cats found in India.

CARACAL (*Caracal caracal*, earlier known as *Felis caracal*)

Description: This is a medium sized cat (length 85 - 114 cm.) with long legs and a short tail. The colour of its coat is uniformly brick red or reddish sandy without any pattern. Its ears are long and pointed, with the characteristic long black tufts (about 50 mm. in length) because of which it is often referred to as the 'desert lynx' (op. cit.). Some authors recognize there are nine sub-species of Caracal but this figure is disputed and not agreed upon universally. Caracal is listed in Appendix II of CITES, although the Asian subspecies, *C. c. schmitzi* and *C. c. michaelis*, considered to be rare or threatened, are listed in Appendix I of CITES (Nowell and Jackson, 1996). *C. c. schmitzi* is classified as Schedule I species in

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Indian Wildlife (Protection) Act, 1972. Some interesting natural history records on Caracal (alongwith photographs) are provided in Divyabhanusinh's book on the cheetah (1995).

Distribution: The Caracal inhabits a wide range of habitats and has a wide distribution globally. It once had a distribution similar to that of the cheetah (*Acinonyx jubatus*) through most of the arid and semi-arid regions of India. Rapid changes in landuse patterns through most Caracal habitats over the last few decades has drastically reduced its range and numbers (Sharma and Sankhala, 1984; Chavan, 1987). Its current distribution in India is restricted to the drier parts (Corbett and Hill, 1992; Kitchener, 1991; Nowell and Jackson, 1996). Wild populations of Caracal have nearly reached extinction in the thorn scrub jungles of Kutch and western India with not more than 10-15 individuals surviving (Chavan, 1987). Sharma and Sankhala (1984), estimated less than 50 individuals in the state of Rajasthan. In the present scenario of continued habitat degradation, rapid steps are urgently required to prevent this species from becoming extinct in India like the cheetah.

Recent records : Since 1996, YV Jhala, Dinesh Sharma, and Bharat Jethwa of the Wildlife Institute of India have had eight sightings (with photographs) of the Caracal in the Kutch district of Gujarat. Besides, its sightings have been reported from other known areas of its distribution (Narayan Sarovar, Gujarat - Justus Joshua pers comm.; Sariska tiger reserve, Rajasthan - pers obv., Ranthambore tiger reserve, Rajasthan - Valmik Thapar pers comm.). It has also been reported from Melghat tiger reserve, Maharashtra (MK Ranjitsinh pers comm., MG Gogate pers comm., and PJ Thosre pers comm.).

Behaviour: Like all cats, Caracal is highly territorial and its home ranges vary greatly in different areas. Its social organisation is also typical, with large male home ranges incorporating smaller exclusive female ranges (Stuart, 1983; Eisenberg, 1986; Weisbein and Mendelsohn, 1990; Kitchener, 1991). A study on food habits of Caracal in Sariska tiger reserve, Rajasthan, conducted by Wildlife Institute of India, revealed that its principle food was rodents followed by birds. Its litter size is 1 - 4 after a gestation of 78 - 81 days. It usually produces one litter annually (Nowell and Jackson, 1996).

JUNGLE CAT (*Felis chaus*)

Description: Jungle cat is morphologically similar to Caracal (Kitchener, 1991; Nowell and Jackson, 1996) - long legs, a short tail and long ears with small tufts at the tip. But its distinguishing features are the bands on the tail and legs of the Jungle cat which are absent in the Caracal.

Distribution: The Jungle cat ranges through North Africa, Southwest Asia and tropical Asia. In the east, its distribution does not go beyond the Isthmus of Kra (Nowell and Jackson, 1996). It is generally considered to be common except in countries at the limits of its geographical range (Nowell and Jackson, 1996). The most common wild cat in India, this felid is distributed through all different vegetation types and most of the climatic zones in the country. And yet, there is a dearth of information on its ecology and behaviour.

Behaviour: Whatever little information that is available on this cat suggests that it prefers areas with access to water and good cover (Dayan *et al.*, 1990; Mukherjee *et al.* in prep.). Agricultural fields which offer sufficient cover and prey are considered good habitat for this cat.

Table 1
Broad categories of regions occupied by small cats

Dry open areas	Wet dense areas
Caracal	Rusty spotted cat
Jungle cat	Fishing cat
Desert cat	Leopard cat
Lynx	Clouded leopard
Pallas cat	Marbled cat
	Golden cat

The small and medium cats are also the lesser known cats due to which they are unfortunately labelled as "the lesser cats". Indeed they are no less than the large cats.

However, disturbance in the form of reduction of vegetative cover or human presence affects this cat adversely (pers obv.) Its major prey are rodents followed by the birds (Schaller, 1967 ; Mukherjee, 1989 ; Mukherjee *et. al.* in prep.). Some scats collected from the hilltops in Sariska tiger reserve which I analysed had remains of several scorpions as well.

The Jungle cat has a shorter gestation period of 63 - 68 days and produces 1 - 6 kittens in a litter (Nowell and Jackson, 1996). In Sariska tiger reserve, I observed mother and kitten units during winter (December - January). There were two such sightings - one of mother with two kittens and the other of mother with three kittens. On several occasions during summer, which is possibly their peak breeding season, I heard males emitting a harsh "bark like meow", preceded by copious marking of bushes by spraying urine. According to Kitchener (1991), the call is produced by males when females are in oestrus and this has been recorded in captive individuals.

DESERT CAT (*Felis silvestris ornata*, earlier known as *Felis lybica*)

Description: The species *Felis silvestris* consists of three wild members - European wild cat (*Felis silvestris silvestris*), African wild cat (*Felis silvestris lybica*) and Asiatic wild cat (*Felis silvestris ornata*). The African wild cat (*Felis silvestris lybica*) is believed to be the ancestor of the house cat (*Felis silvestris catus*). Little wonder then that the Desert cat, as the Asiatic wild cat is commonly known in India, closely resembles the house cat. In fact, its tabby (stripes or spots) markings on a grey to ruddy grey coat often make it difficult to distinguish this cat from the domestic tabby without a good sighting. The Desert cat weighs 3 - 4 kg.

Distribution: The common name

Desert cat suggests that this felid is found in dry open areas in Rajasthan and Gujarat (Prater, 1965 ; Kitchener, 1991 ; Nowell and Jackson, 1996). This distribution in the dry desert regions also distinguishes it from its African and European relatives which inhabit a wide range of habitats but chiefly the woodland areas.

Recent records : New sightings suggest that the Desert cat is found in Maharashtra and Madhya Pradesh as well. This cat has been reported from Pench tiger reserve in Maharashtra, where it was sighted approx. 4 km from a forest village, in a rocky, gently undulating area dominated by teak and bamboo, (Khalid Pasha pers comm.) and from Panna tiger reserve in Madhya Pradesh (TRK Yoganand pers comm.).

Behaviour: The Desert cat is not as nocturnal as the other small cats and feeds chiefly on rodents, hare, birds, reptiles and insects (Nowell and Jackson, 1996) . The gestation period lasts 58 - 62 days and litter size is generally 2 - 3 but may sometimes be as high as 5 - 6 kittens (Nowell and Jackson, 1996).

EURASIAN LYNX (*Lynx lynx*, earlier known as *Felis lynx*)

Description: The Lynx is a medium sized cat weighing 18 - 21 kg (Nowell and Jackson, 1996). It has relatively long legs, a short tail and tufted ears. The paws are large and padded with "snow shoes" or thick fur to enable easy movement over deep snow (Nowell and Jackson, 1996). Its coat is grey to ruddy grey with tabby markings which may not be very prominent in some individuals (Nowell and Jackson, 1996).

Distribution: The genus Lynx spreads over Asia, Europe and the Americas. The Eurasian Lynx, which is the largest in this genus, occurs in Asia

and Europe. Within India, it is found in the cold desert and alpine regions throughout the northern parts of the Himalaya (Chundawat 1990, Nowell and Jackson, 1996). Chundawat (1990) has reported Lynx from the Nubra valley in Ladakh.

Habitat: Lynx habitat is variable, ranging from woodland to barren rocky areas above the treeline (Nowell and Jackson, 1996). In the Nubra valley in Ladakh, Lynx inhabits thick scrub and woodland (Chundawat, 1990).

Behaviour: The Lynx is mainly crepuscular with peaks in activity, around evening and morning (Nowell and Jackson, 1996). Although the other members of the genera feed chiefly on lagomorphs, the Eurasian Lynx preys on ungulates and takes small prey only when the larger ones are scarce (Nowell and Jackson, 1996). The average gestation is 69 days and litter size is 2 - 3 kittens (Nowell and Jackson, 1996).

PALLAS CAT or MANUL

(*Otocolobus manul*, earlier known as *Felis manul*)

Description: The Pallas is a rather strange looking cat with thick long fur, eyes placed high up on the forehead, a flat low forehead and small ears low down to the sides of the head. This cat was wrongly thought to be the ancestor of some breeds of the domestic cat, notably the Persian breed (Nowell and Jackson, 1996).

Pallas cat is small in size, weighing between 2 - 4.5 kg. and has a grey to ruddy grey coat. Its legs are short and striped. The forehead is spotted and the tail is bushy and striped (Prater, 1965 ; Kitchener, 1991 ; Nowell and Jackson, 1996). It has some morphological similarities with the Sand cat (*Felis margarita*) found in the deserts of Africa, Arabia, Israel and

Pakistan but not in India. These similarities, such as enlarged auditory bullae (which aid in hearing) and a flattened forehead, are considered to be adaptations to living in open habitat (Nowell and Jackson, 1996).

Distribution: Globally, its distribution spans the cold arid regions of the central Asia. The northern cold desert region of Ladakh in India is its southernmost distribution (Nowell and Jackson, 1996). It is reported to be widely distributed in the Tibetan plateau but is extremely rare in India (Nowell and Jackson, 1996). It generally inhabits the rolling grassland or stony alpine patches and rocky outcrops up to 4800m. elevation. It does not occur in areas with thick snow cover or at very high altitudes (Nowell and Jackson, 1996).

Behaviour: Pallas cat is chiefly crepuscular and feeds mainly on pikas (Family: Lagomorpha) and rodents. Birds and insectivores also form part of its diet. Its call, which is "bark like", is similar to that of the Sand cat (Nowell and Jackson, 1996). It rests in crevices, caves or burrows of other animals. Four to five kittens (sometimes up to 8) are born in a litter usually around April - May after a gestation period of 66 - 75 days (Nowell and Jackson, 1996).

RUSTY SPOTTED CAT

(*Prionailurus rubiginosus*, earlier known as *Felis rubiginosa*)

Description: This is the smallest member of the cat family, weighing only 1 - 2 kg. Its coat is typically ruddy grey, with rust coloured spots on the body and stripes on the forehead and legs. Its tail is unmarked, which distinguishes it from the Leopard cat with which it can be confused (Nowell and Jackson, 1996). Its ears are rounded and its eyes are very large.

Distribution: The Rusty spotted cat is found only in India and Sri Lanka. In India, it was earlier thought to be distributed only in the southern part of the country, but then it surprised naturalists by showing up in areas far from its earlier range. It is now established that, besides southern India (Nowell and Jackson, 1996), this species occurs in Maharashtra (Advait Edgaonkar pers comm ; Khalid Pasha pers comm. ; Yogesh Dubey pers comm.), Gujarat (Nowell and Jackson, 1996), Madhya Pradesh (Vidya Athreya and Christy Williams pers comm.) and Rajasthan (pers. obv.) as well.

Habitat: The habitat of this cat is varied in range, from rocky outcrops and dry deciduous forests to areas around human habitation, the latter especially in southern India (Meera Oommen pers comm. ; Nowell and Jackson, 1996).

Recent records : Dead specimens were collected from Borivilli national park, Mumbai (Advait Edgaonkar pers comm.) ; Tadoba tiger reserve, Maharashtra (Yogesh Dubey pers comm.) and Pench tiger reserve, Maharashtra (Khalid Pasha pers comm.). Besides, one cat was sighted in Tadoba tiger reserve; and one at night near Kuno wildlife sanctuary, Madhya Pradesh (Vidya Athreya and Christy Williams pers comm.); and I sighted and photographed one in Sariska tiger reserve at night when the cat was sitting on a culvert in a narrow grassland habitat surrounded by rocky hills. It was barely 5-8 m. away and did not seem perturbed by human presence and continued sitting even as the camera flash lit. It also showed no signs of aggression.

From the known areas of its distribution, the Rusty spotted cat was sighted on the Mundanthurai

plateau on several occasions (Kaberi Kar Gupta pers comm. ; Madhusudhan Katti pers comm. ; Jayanti pers comm. ; Divya Mudappa pers comm. and AJT Johnsingh pers comm.). Most of the sightings were made during the night. One sighting was made during the early hours of the day when the cat was basking on a tamarind tree (AJT Johnsingh pers comm.).

Behaviour: The Rusty spotted cat is arboreal and nocturnal, feeds chiefly on small mammals and birds, and at times raids poultry farms (Nowell and Jackson, 1996). Litter size is 1 - 2 kittens after a gestation of 66 - 68 days (Nowell and Jackson, 1996).

FISHING CAT (*Prionailurus viverrinus*)

Description : Fishing cat is a close relative of the Rusty spotted cat, but is a much larger medium sized felid weighing 6 - 12 kg. (Nowell and Jackson, 1996). It is stockily built and looks powerful. It has a distinctly spotted coat of olive - grey colour (Nowell and Jackson, 1996). Its tail and legs are short. The feet are webbed and the claws are not fully retractile (Nowell and Jackson, 1996).

Distribution : Globally, the Fishing cat has a distribution spread across some parts of Pakistan, India, Nepal, Bangladesh, Sri Lanka, Myanmar, Laos, Vietnam, Thailand, Malaysia, Java and Sumatra. Within India, it is widely, though patchily, distributed. It occurs in the southern parts of the Western Ghats, in Keoladeo Ghana national park, Bharatpur (Rajasthan), through the terai belt of northern India, notably Dudhwa and Corbett tiger reserves (Uttar Pradesh), through much of West Bengal, Assam and the other north-eastern states (Nowell and Jackson, 1996).

Habitat : The habitat of this cat is typically wetland or marshy areas such as swamps, reed beds, tidal creeks and mangroves (Nowell and Jackson, 1996). Dense vegetation also characterises its habitat. As such, though Fishing cat may occur in a large variety of broad vegetation categories, it is restricted to swampy areas within these broad zones (Nowell and Jackson, 1996).

Behaviour : As its name suggests, the felid feeds mainly on fish, though rodents and birds also form a substantial portion of its diet (Mukherjee, 1989 ; Nowell and Jackson, 1996).

In the summer of 1989 at Bharatpur, I once observed a Fishing cat from 1945 hr. to 0030 hr. (five hours) as it waited at the edge of a canal to catch fish. It would wait approximately 15 minutes at one place and then move to another place a few metres away and wait there, gazing intently at the water. It would then come back to the original place. It caught and ate whatever came its way (I suspect insects and frogs). It even tried to catch a turtle which was swimming by (swatting it with its paw), which I guess it mistook for a fish as it promptly retracted its paw when the turtle surfaced. Finally, it sighted a fish, dived into the water and after delivering vigorous blows on the fish with its paw swam beneath the surface of the water and emerged on the other side of the bank with the fish in its mouth.

During a study at Keoladeo national park in Bharatpur, I collected nine scat samples of the Fishing cat, all of which, on analysis, were found to have fish remains while 88% and 44 % had remains of rodents and birds respectively (Mukherjee, 1989). Fishing cat also consumes small

ungulates such as chital fawns and wild pigs (Nowell and Jackson, 1996) and have also been observed scavenging carcasses and even kills made by tigers (Nowell and Jackson, 1996).

In Bharatpur, they were found to be mainly nocturnal though their time of activities varied between different places (Nowell and Jackson, 1996). Mating has been observed in winter (January to February) as well as in summer (June), and after a gestation of 63 -70 days, 2 - 3 young are born (Nowell and Jackson, 1996).

LEOPARD CAT (*Prionailurus bengalensis*)

Description : Another close relative of the Rusty spotted cat, the Leopard cat is more profusely marked with spots and rosettes, much like that of a leopard, the reason for its common name.

The colour of its coat varies from yellowish brown in the tropics to grey in the northern parts of its range (Nowell and Jackson, 1996). The tail is banded and long. The cat usually weighs 3 - 4 kg., though some males in Russia have been reported to weigh up to 7 kg. (Nowell and Jackson, 1996).

Distribution : Among the *Prionailurus* genera found in India, the Leopard cat has the widest distribution. In fact, it is the most common small cat after the Jungle cat and occurs throughout the country except in the dry arid regions of Rajasthan, Gujarat and some parts of the peninsular India. It also occurs in the Himalaya, mostly at lower altitudes and areas which do not have heavy snow cover (Nowell and Jackson, 1996). Elsewhere, it is found in parts of Pakistan, India, Nepal, Bangladesh, China, Russia, Japan, North and South

Korea, Myanmar, Thailand, Laos, Vietnam, Taiwan, Philippines, Cambodia, Malaysia, Singapore, Borneo, Java and Sumatra.

Habitat : Typically, the Leopard cat habitat is moist forested areas but the animal is also found in agricultural plantations close to human habitation (Nowell and Jackson, 1996). As with many other small cats, proximity to water sources is an important factor characterising its habitat (Nowell and Jackson, 1996).

Recent records : These sightings have been made in areas expected to have Leopard cats. One individual was sighted in the morning at around 1000 hr. in Pench tiger reserve, Maharashtra in an undulating rocky habitat dominated by teak (G Arindran pers comm.). Two sightings were reported from Borajan Reserve, Assam in a degraded forest patch within the boundaries of a forest village - one at night when the cat was active and the other, when it was flushed out from a dense patch of scrub during the day probably while it was resting (Kashmira Kakati pers comm.). Several sightings were reported (at dusk and during night) in Kedarnath Musk Deer sanctuary (Meera Oommen, Rashid Raza and S Sathyakumar pers comm.).

Behaviour : Leopard cat is arboreal to some extent and mostly active during the night, although telemetry studies in Thailand have shown individual variations in the time of activity, with some activity during the daytime as well (Nowell and Jackson, 1996). Its diet consists chiefly of rodents, though birds, reptiles, insects, carrion and even young ungulates are also eaten (Nowell and Jackson, 1996). Its breeding season varies from place to places - from being restricted to winter to all year

round. Gestation lasts for 57 - 60 days and 1- 4 kittens are born in a litter.

CLOUDED LEOPARD (*Neofelis nebulosa*)

Description : The distinctive marbled pattern on the coat of the Clouded leopard gives this felid its common as well as scientific name. Other features that distinguish it from most other members of the Felidae are its longish skull and larger canines. The tail, which is long and equal to the head and body length, is thick and ringed. Its legs are comparatively short. The Clouded leopard weighs 11 - 20 kg. and can often be confused for the much smaller Marbled cat from which it is distinct in terms of size, proportionate length of legs (to body size) and shape of skull.

Distribution : The Clouded leopard is found in the dense forested areas in parts of India, Nepal, Bangladesh, China, Burma, Thailand, Malaysia, Vietnam, Borneo, Cambodia and Indonesia. Within India, it occurs in the rainforests of the north-eastern region in north Bengal, Arunachal Pradesh, Assam and Meghalaya (Nowell and Jackson, 1996 ; Christy Williams pers comm.).

Habitat : Its habitat is mainly tropical rainforest but it also occupies the secondary logged forests, mangroves, dry tropical forests and scrub.

Recent records : A killed specimen of Leopard cat was found in the Garo hills of Meghalaya at night (Christy Williams pers comm.). One sighting was reported of what could be either a Clouded leopard or Marbled cat, from Balphakram national park, Meghalaya, (Christy Williams and Manoj Nair pers comm.).

Behaviour : This arboreal felid uses

trees mainly for resting but probably forages there as well. On the ground, it feeds on a variety of mammals of varying sizes such as ungulates, primates and rodents such as porcupine as well as other smaller rodents, mammals and birds (Nowell and Jackson, 1996). However, primates seem to be its main prey in many areas.

The Clouded leopard is mainly nocturnal but may be less so in areas where there are fewer large cats such as tiger and leopard (Nowell and Jackson, 1996). Litter size is usually three after a gestation of 87 - 99 days.

MARBLED CAT (*Pardofelis marmorata*)

Description: The coat of the Marbled cat is very similar to that of the Clouded leopard. However, this felid is less than a third the size of the latter, and has a more rounded skull and relatively longer legs (Nowell and Jackson, 1996). Some authors feel that the similarity in coat pattern as well as the size of canines (Marbled cats have large upper canines) suggest its evolutionary proximity to the Clouded leopard (Nowell and Jackson, 1996).

Distribution : Similar to that of the clouded leopard both globally as well as within India.

Habitat : Moist tropical forests.

Behaviour : Very little is known of this arboreal cat. It is possibly mainly nocturnal and possibly feeds largely on rodents and some birds. Litter size is 1 - 4 and the gestation period lasts approximately 81 days.

GOLDEN CAT (*Catopuma temmincki*, earlier known as *Profelis temmincki* or *Felis temmincki*)

Description : This medium sized felid weighs between 8 and 15 kg. The

colour and pattern of its coat is variable, ranging from uniform to one which is heavily blotched. The most common coat colour is ruddy brown (Nowell and Jackson, 1996).

Distribution : Similar to that of the Clouded leopard, both within and outside India.

Habitat : This cat inhabits a wide range of habitat types from tropical evergreen forests to dry deciduous forests as well as the more open areas such as scrub and grasslands (Nowell and Jackson, 1996).

Behaviour : Golden cat is mainly nocturnal and its diet consists chiefly of rodents, birds, reptiles as well as small ungulates such as goral and barking deer (Nowell and Jackson, 1996). The gestation period lasts approximately 80 days and the usual litter size is 1 - 2.

A THOUGHT TO PONDER OVER

Cats are, in a way, food specialists as compared to some other mammalian taxa. As they cannot digest carbohydrates very efficiently, they are totally dependent on a carnivorous diet for their survival. They obtain certain nutrients such as vitamin B and taurine solely from secondary sources such as meat. As such, feline survival is linked to habitat quality since that would affect prey abundance. Although this relationship seems simple and a measure of the status of the cats inhabiting an area would seemingly indicate its quality, there are several problems, e.g. how to determine the status of cats? or, does high abundance necessarily indicate good habitat quality? etc. Their dietary specialization alongwith secretive and solitary habits, make cats more vulnerable and less tolerant to disturbance than some other species.

This apart, there is a tendency to conserve only that which is obvious and beneficial to us, little realising that a vast array of subjects unknown to us now, possibly ensure our survival. Reasons such as biodiversity, beauty and ethics may find sympathisers wishing to practice conservation. However, unfortunately again, such people are not only very few in number but also not the ones in power who can actively implement conservation laws.

Our current knowledge on small cats (as well as other small carnivores and most other organisms inconspicuous to us) is almost negligible. It would be regrettable if we discover their importance only after they are lost.

Wouldn't it then be wise to simply conserve them now!

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Small cats in Rajasthan

VD Sharma

THE BIG CATS have always inspired our imagination. They are admired, even worshipped, and at the same time, feared by the people who share their habitats. In recent past, however, the big cats have been ruthlessly persecuted by man for a number of reasons, and their habitats have been destroyed by an ever increasing human population. Consequently, special programmes were launched to save these big cats, providing them with a new lease of life for some time.

The small cats, on the other hand, were neither sought after as hunting trophies nor posed any threat to our livestock, and so did not attract our attention. But these very secretive small cats are every bit as interesting as the big cats and, in fact, at times exhibit more stealth, ferocity and cunning in their daily activities.

Only sketchy and relatively inaccurate information about the occurrence and distribution of small cats in Rajasthan is available in literature. In his book *The Western Rajputana Rifles*, Lt Col Archibald Adams (1900) wrote, "There are at least four varieties of wild cats met with in these states, viz. the marbled tiger cat (*Felis marmorata*), the leopard cat (*Felis bengalensis*), the common jungle cat (*Felis chaus*), and the common tree cat (*Paradoxurus musanga*). These cats do much harm to small game and poultry, and

should be destroyed when opportunity offers."

Prater has described the occurrence of Desert cat, Jungle cat and Caracal in the arid parts of Rajasthan. Dr Ishwar Prakash (1961) recorded evidence of Caracal in the desert region near Bikaner. Sen and Sankhala (1962) have described the occurrence and distribution of the Desert cat and Jungle cat in Rajasthan, although later observations and seizures of cat pelts from poachers produced evidences of their occurrence in areas not reported earlier. Saxena (1975) reported Fishing cat and Leopard cat in the Keoladeo Ghana national park, Bharatpur. The presence of Fishing cat was confirmed, but no evidence of presence of the Leopard cat could be collected. Recently Shomita Mukherjee (Wildlife Institute of India) recorded the presence of Rusty spotted cat in Sariska tiger reserve.

In all, there are the following five species of small cats found in Rajasthan. Their following description is based on whatever little information available.

DESERT CAT (*Felis silvestris ornata*)
Found all over the state. Earlier it was reported to inhabit only the arid areas on the western side of the Aravalli, but in a recent survey conducted by the Zoological Survey of India, Desert cats have been

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reported in Jhalawar district (Kankane, 1997) which is on the eastern side of the Aravalli hills. Prater (1965) has described its distribution in the desert in north - western India. Westward, the range extends through the deserts from Sind to northern Africa, and northwards into the steppes in central Asia.

The Desert cat's most preferred habitat is dry scrub area with an abundance of desert gerbils and other prey species, such as rodents, insects, reptiles and a variety of birds like doves, grey partridge, sandgrouse, peafowl, etc. It is also known to kill cobras, saw-scaled vipers, geckos and scorpions. It needs some kind of cover to hunt and ambush its prey. Its burrow, made in slightly raised ground, has tufts of grasses or bushes used ingeniously to provide some concealment.

However, the Desert cat has also been observed by the author near cultivated fields in Choti Bagru and Kukas villages in the Jaipur district. In fact, the wild cats sometimes mate with the village cats and mixed breed cats are often found near habitations.

The female attain sexual maturity at about 10 months of age whereas the males take up to 21-22 months to attain sexual maturity. The mother looks after the kittens and hides them in the burrows, till they are weaned.

The main threat to the Desert cat is from poachers and skin traders. Although the cat is listed in Schedule I of the Indian Wildlife (Protection) Act, 1972, it continues to be killed for its pelt. In a wildlife offence case registered by the wildlife staff in December 1997, in the Barmer district, 703 animal skins were recovered from a poacher, of which 97 were of the Desert cat.

The other threat to this cat is from the so-called planned development of the wastelands which has resulted in the destruction of the Desert cat habitat and breeding areas. The kittens are also vulnerable to getting killed by the males and cats of other species such as the Jungle cat or even the village cat.

JUNGLE CAT (*Felis chaus*)

The long legs, slender body and a short tail give the Jungle cat a very distinctive appearance. The winter coat is darker and more dense than the summer coat. Melanistic individuals have so far not been reported from Rajasthan.

Called *jungli billi* or *ban bilao* in Rajasthan, it is found in a wide variety of habitats, from dry arid areas in the Desert national park to the swampy areas of Keoladeo Ghana national park. It has been reported from all the sanctuaries and national parks in the state. It also inhabits the forested areas of the Aravalli and Vindhya hills, and is also present on the outskirts of villages and cultivated fields.

The Jungle cat preys mainly on rodents, reptiles and birds. In Sariska, it has been seen feeding on carcasses. Cats frequenting habitations and villages can become a menace for the poultry.

Although now included in Schedule II, Part II of the Indian Wildlife (Protection) Act, 1972, the Jungle cat is still hunted for its fur in the state, by nomadic tribes viz., *jogi* and *kalbelia*. Two cases, involving Jungle cat skins were registered by the field staff of the wildlife wing in December 1997 in Barmer and Jodhpur districts.

CARACAL (*Caracal caracal*)

Locally called *siyeh gosh*, the Caracal is easily recognisable from its tufted

The jungle cat's bold and aggressive behaviour is recorded in the history of Mewar (Udaipur). It is told that when Maharana Pratap was in hiding after losing the battle of Haldighati, a jungle cat snatched away the only piece of *roti* (bread) from the hands of his hungry daughter. The Maharana was so shaken up by the incident that he even considered surrendering himself before the ruler of Delhi.

black ears, larger hind limbs and erect walk. Its coat is a uniform reddish grey above, fading into buff or white below. There are faint impressions of spots on the undersurface and at times on the back.

In the past, Caracal was reported in number of areas of Ajmer, Pali, Tonk, Sikar, Bikaner and Jaipur districts, but it has not been sighted or reported from these districts for quite some time now. In the past, the skins of Caracal were recovered along with skins of other animals like the jackal, fox and other cats in seizures made by the wildlife staff, but no such recovery has been made of late. In fact, this rarest of the small cats found in Rajasthan is now probably confined to just two protected areas in the state - Sariska tiger reserve and Ranthambore national park where they are occasionally sighted. There is a need to conduct an intensive survey in the known habitats of Caracal to confirm its presence.

FISHING CAT (*Prionailurus viverrinus*)

This is a comparatively larger sized, stoutly built cat which may attain a body length of up to 86 cm. and tail up to 33 cm. It is nocturnal in nature.

Prater (1965) and Tikkedar (1983) have not mentioned the presence of this cat in Keoladeo Ghana national park, but about 20 Fishing cats live in the different areas of the park, like Baba Sita Ram ki diggi, Sapan mori, Kadam kunj and the Keoladeo temple area. Although, the cat is not known to enter water in pursuit of its prey, I have observed it plunging into water to catch fish. A study based on scat analysis of cats in Keoladeo Ghana national park indicated that fish constituted a major part (up to 76 %) of their diet all round the year.

Other food consumed included reptiles, molluscs and seeds, etc. One cat here was seen feeding on the carcass of a cow.

The cat breeds well inside the Keoladeo yet no information about its breeding and other habits has been collected. In Rajasthan, there are many areas where it can be found but no systematic surveys have been undertaken to find its occurrence in these areas.

RUSTY SPOTTED CAT (*Prionailurus rubiginosus*)

A Rusty spotted cat was observed and photographed in Sariska tiger reserve for the first time by Shomita Mukherjee (Wildlife Institute of India) in 1994-95. Prior to this, a dead Rusty spotted cat was reported in 1992, near Udaipur, by Tehsin Raza (1994). Due to its small size and arboreal, nocturnal and secretive nature, the Rusty spotted cat escapes detection by casual observers. However, there is strong possibility of its existence in other areas in the state having grassland and scrub forest. A systematic survey of these habitats is needed to establish its distribution.

CONCLUSION

The Jungle cat and the Desert cat are distributed all over the state. Although the expansion of agriculture over large areas into the pastures and wastelands, have reduced their natural habitats, these two species still have sufficient habitat left to survive. In fact, they have learnt to live in and around the cultivated areas where their breeding has been observed.

The major problem is that the small cats have never been taken seriously. As a result of our apathy, the Jungle

cat is officially not recognised as a wildlife species and finds no mention in any of the schedules in the Indian Wildlife (Protection) Act, 1972. The Desert cat finds mention, but in Schedule IV. These omissions have proved very costly for these cats.

The pelt traders dealing in wildlife products pose another major threat to these species. They have taken full advantage of the legal lacunae and get these cats killed for their skins. In Rajasthan, the skin traders pay in advance to collect the skins, particularly of the Jungle cat whose pelt is soft and used for making gloves and caps, from the nomadic tribals like *jogi* and *kalbelia* who traditionally hunt animals in the desert region. One such skin dealer in Rajasthan reported a stock of 24,552 skins of Jungle cat in his return to the Forest Department for the month of November 1977. Such large scale slaughter of these cats was indeed startling and these destructive practices must be controlled rigidly to conserve these cats.

In August 1980, the Rajasthan government approached the Centre for inclusion of the Jungle cat in Schedule I and upgradation of the Desert cat from Schedule IV to Schedule I of the Indian Wildlife (Protection) Act, 1972, within the state of Rajasthan. The request of the State government was partially agreed to in December 1981, by which the Desert cat was placed in Schedule I and the Jungle cat in Schedule II, Part II. However, these amendments in the Schedules were effected only in 1986.

The number of Caracals and Fishing cats in the state might not be more than 20 individuals of each species. A survey for the three species of cats viz. Caracal, Fishing cat and Rusty

spotted cat needs to be undertaken urgently to ascertain their distribution and status in the various protected areas and other natural habitats in the state. A programme to reintroduce the Caracal in suitable habitats, which are still available, should also be undertaken at the earliest.

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The six small cats of Orissa

LN Acharjyo

THE STATE OF Orissa has a geographical area of 1,55,707 sq km, with an actual forest cover of 47,107 sq km (30.3%) including 195 sq km of mangrove forests (Anon. 1996). The forests are unevenly distributed and this is the main reason for the concentration of wild animals in certain areas and their absence in others. The Indian Wildlife (Protection) Act, 1972 was promulgated in the state in August 1974, and a separate wildlife wing within the state forest department was created in June 1976. There are 18 wildlife sanctuaries and two proposed national parks, covering an area of 6677.50 sq km in the state. The percentage of protected areas to geographical and forest areas of the state equals 4.10 and 10.37 respectively, (Anon., 1997).

Of the 11 species of small cats in India, six species are known to occur in Orissa. Each sanctuary has one or more species of small cats. The proposed national parks - Similipal and Bhitarkanika have three species of small cats each, namely the Leopard cat, Fishing cat and Jungle cat. Here is provided information on the occurrence and status of these species in Orissa.

JUNGLE CAT (*Felis chaus*)

This is the most common small cat distributed all over the state (Behura and Guru, 1969; Mishra *et al.*, 1996). It has been reported from the

districts of Cuttack, Khurda, Kalahandi, Rayagada and Sundergarh (Das *et al.*, 1993). Of and on, there have been reports from different parts of the state on depredation of the poultry by the Jungle cat. Between 1963 and 1992, eighteen (7 males and 11 females) individuals have been received at the Nandankanan zoological park, mostly from nearby areas and two kittens from Rayagada (Rayagada district). Within the zoo itself, many Jungle cats have been captured with the help of traps, as they frequently attack zoo birds through the cage barriers.

Current status : Included in Part II, Schedule II of the Indian Wildlife (Protection) Act., 1972. There appears to be no immediate danger to this species as it is able to thrive in different habitats, including mangrove areas.

LEOPARD CAT (*Prionailurus bengalensis*)

The Leopard cat is found in all the forests of the state (Behura and Guru, 1969), particularly in the forests of Mayurbhanj, Keonjhar, undivided Koraput, Puri, Cuttack and Ganjam districts (Mishra *et al.*, 1996). Between 1966 and 1992, eighteen (11 males and 7 females) individuals of this species were received at the Nandankanan zoo from different areas of Similipal forests (Mayurbhanj district), Chitrakonda (Malkangiri district), Parlakhemundi (Gajapati

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district), Anandapur (Keonjhar district), Balugaon (Khurda district) and Nawarangpur (Nawarangpur district). In 1996, one individual was seen by the author inside Bhitarkanika (Kendrapara district).

Current status : Included in Schedule I of Indian Wildlife (Protection) Act, 1972 and Appendix I of CITES. Designated as "vulnerable" in the Red Data Book. Habitat loss is the main reason for its decline in the wild.

FISHING CAT (*Prionailurus viverrinus*)

Fishing cat is restricted to Keonjhar, Mayurbhanj and Puri districts, Bhitarkanika, Chilika and other coastal areas (Mishra et. al., 1996). Its occurrence in Orissa was reported for the first time by Acharjyo and Mishra (1975) from the Keonjhar district. Seven individuals (5 males and 2 females) were received at Nandankanan zoo from the forests near Anandpur (Keonjhar district), Balugaon (Khurda district), Nimapara and Chandanpur (Puri district), Bhitarkanika (Kendrapara district) and Similipal tiger reserve (Mayurbhanj district) during the period 1961-1992.

Current status Included in Schedule I of the Indian Wildlife (Protection) Act, 1972 and in Appendix II of CITES. Designated as "vulnerable" in the Red Data Book. Their number in the state is declining due to killing and habitat loss (Mishra et. al., 1996).

RUSTY SPOTTED CAT (*Prionailurus rubiginosus*) : Two (one male and one female) kittens of this species were collected from the forests of Daringibadi block in Phulbani district and received at the Nandankanan zoo in February 1995. Initially, they were identified as Leopard cat kittens. The male died within one month, but the

female has since matured and has been identified as Rusty spotted cat on the basis of its size and colour pattern (Acharjyo et. al., 1997). This was the first report of its occurrence in Orissa (Behura and Guru, 1969; Das et. al., 1993, Mishra et. al., 1996).

Current status : Included in Schedule I of the Indian Wildlife (Protection) Act, 1972. With only a single report of its occurrence, studies are necessary on its status in Orissa.

MARbled CAT (*Pardofelis marmorata*)

Two individuals of this species were reportedly captured in Phulbani forests and brought to the first wildlife exhibition held at Bhubaneswar in 1956. But since then there has been no further report on its existence in the state (Anon., 1969; Mishra et. al., 1996).

Current status : Included in Schedule I of the Indian Wildlife (Protection) Act, 1972 and in Appendix I of CITES. Designated as "endangered" in the Red Data Book. Current existence doubtful since it has been reported only once, 42 years ago.

CARACAL (*Caracal caracal*)

On the basis of a newspaper report published in The Statesman, Calcutta of 18 April 1962. Behura and Duru (1969) reported the occurrence of Caracal in the Mayurbhanj district. But there have been no other reports of its occurrence in the state nor has any individual been received at the Nandankanan zoo from any part of Orissa.

Current status : Included in Schedule I of the Indian Wildlife (Protection) Act, 1972 and in Appendix I of CITES. Designated as "endangered" in the Red Data Book. Present occurrence in the state is doubtful.

Attempts have been made to breed the common of the small cats, namely Fishing cat, Leopard cat and Jungle cat in captivity at the Nandankanan zoo. But these have been successful only in the case of the Leopard cat and Jungle cat. Studies on the management, feeding, breeding habits, longevity, diseases and parasites of the small cat species in captivity have been carried out at the zoo from time to time and their findings published in reputed Indian journals.

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Small cats in Andhra Pradesh

SD Mukherjee

THE FOLLOWING small cats are known to exist in Andhra Pradesh.

JUNGLE CAT (*Felis chaus*)

Locally known as *jangu pilly*, it has a tendency to stay closer to water, among reeds and typha bushes. Being nocturnal, it offers only fleeting glimpses. However, it is found in almost all forest types, particularly the scrub jungles, grasslands and cultivated fields, and is reported from almost all the sanctuaries and national parks in Andhra Pradesh. On account of its adaptability to various habitats, there is no immediate threat to its existence.

LEOPARD CAT (*Prionailurus bengalensis*)

Found mostly in mixed deciduous and moist deciduous forests, particularly in the Eastern Ghats, Seshachalam hills and Nallamalai hill ranges, it is among the rarer cats. It is mainly arboreal, nocturnal and very elusive.

FISHING CAT (*Prionailurus viverrinus*)

It is the largest of the small cats in Andhra Pradesh, rare and found only in the coastal wetlands and mangroves, especially in the Coringa and Krishna wildlife sanctuaries. The gradual disappearance of the wetlands is bound to effect this species adversely.

RUSTY SPOTTED CAT (*Prionailurus rubiginosus*)

This most rare small cat is found in the northern areas of the Godavari valley and Telangana regions. A live specimen, caught by locals who thought it to be a Jungle cat cub, was received at the Nehru zoological park, Hyderabad in the early 1980's, where it survived for a long period.

Considering the scant information available on the status of the wild small cats in the state, there is every need to study this group of animals which plays a vital role in its ecosystems. The danger to these animals from poaching is minimal, at least in Andhra Pradesh, but their survival is at risk due to an indiscriminate use of pesticides, rodenticides, reclamation of wetlands and the loss of tree cover in the forests.

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Records of small cats in Gujarat

HS Singh

IN ALL, FIVE species of small cats occur in Gujarat. But no studies have been carried out on any of these and there are only some records of their sightings, documented by scientists and nature lovers. In the absence of proper studies, it would not be possible to indicate the changes in their population and distribution, but nature lovers feel that their populations and range of distribution have declined everywhere, except in Gir wildlife sanctuary and national park. This decline has been largely due to the loss of habitat. Although the creation of protected areas has somewhat helped preserve their habitats in some regions, the state government has not taken up any specific measure to conserve the small cats.

The following are the small cat species found in Gujarat.

CARACAL (*Caracal caracal*)

This species once occurred in good numbers in the scrub forest, grassland (*vidi*) and thorn forest habitats in the Saurashtra and Kutch regions. But with the degradation of these habitats, the scenario has changed and it is now rarely seen. In 1996, Dr YV Jhala (Wildlife Institute of India) sighted and photographed Caracal in Kutch. A forester also recorded this species in a grassland in Saurashtra. In 1997, a forest official reported the sighting of this cat on *baet* in the Little Rann of Kutch. A study team comprising members from Gujarat

Ecological Education and Research Foundation (Gandhinagar) and Gujarat Institute of Desert Ecology (Bhuj) sighted Caracal twice in the Narayan Sarovar wildlife sanctuary, in February and March 1998. Sightings are rare and a few animals may be surviving in this part of the state, but overall, the Caracal is facing a high degree of threat and can be considered endangered in Gujarat.

DESERT CAT (*Felis silvestris ornata*)
In Gujarat, the Desert cat inhabits the grasslands, thorn forests, savannah type vegetation and scrub forests. Past records indicate that this cat was found in Saurashtra, Kutch and north Gujarat. Although its distribution has not been studied properly and its sightings are rare, information from various sources indicates that it still occurs in some of its old habitats in Saurashtra and Kutch.

RUSTY SPOTTED CAT (*Prionailurus rubiginosus*)

In the absence of any proper study on Rusty spotted cat, it is difficult to compare the status and distribution of the species in different parts of the state. However, Pathak (1990) made a confirmed report and photographed it in Gir in May 1990. A kitten was also found in Gir after the first record in Gir. The animal has since been sighted and photographed over half a dozen times in Gir. Similarly, this cat has also been recorded in Shoolpaneshwar wildlife sanctuary

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and Vansada national park. It appears that the Rusty spotted cat is also found in the forests of south Gujarat and Girnar and its occurrence in Panchmahal and Sabarkantha regions also cannot be ruled out.

LEOPARD CAT (*Prionailurus bengalensis*)

The only record of this cat is of Dr SA Chavan sighting an individual in Shoolpaneshwar wildlife sanctuary. It is difficult to map the distribution of this species as it has not been studied. However, its occurrence in very small numbers in the forests of south Gujarat is not ruled out.

JUNGLE CAT (*Felis chaus*)

The Jungle cat is found throughout Gujarat, in thick to open forests, grasslands, scrub forests, ravines and

bushlands. It is particularly common in Gir, Girnar and the forests of south and north Gujarat. As in the case of other wildlife, this animal too is adversely affected due to the degradation of its habitat.

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Smaller cats of Maharashtra

MG Gogate

SMALLER CATS HAVE proved to be far more elusive than the legendary movement of tiger, described as "flowing past of a ghost". Thus the group of "small wild cats" has not received as much attention as tiger or lion. Information on their status is generally scanty. The need to understand these "small cats" is realised when one sees lack of even basic information on their very existence.

As a Field Director of Melghat tiger reserve, during 1987-1991, available literature on "cats" in general was collected by the author and analysed. While talking to wildlife wardens in the field, it was realised that the tiger and panther mattered much more, and even tourists were obsessed with viewing major carnivores and were hardly impressed by the sighting of small cats in the wild.

LITERATURE REVIEW

Libraries in Wildlife Institute of India, Dehra Dun; Bombay Natural History Society, Mumbai; Zoological Survey office in Pune, etc. were consulted. The literature review including the famous *shikar* stories, generated a lot of information on the tiger (it was possible to compile a bibliography covering over six hundred and fifty references), but there were hardly 20 - 30 references on wild cats of western and central India.

Khajuria and Ghosh, 1981; Prater,

1980; Taylor and Francis, 1939; Tikkedar, 1983; Anon., 1982, etc. have suggested the possibilities of the following cats being in Maharashtra :

- (1) Jungle cat (*Felis chaus*);
- (2) Wild or Desert cat (*Felis silvestris ornata*);
- (3) Leopard cat (*Prionailurus bengalensis*);
- (4) Rusty spotted cat (*Prionailurus rubiginosus*); and
- (5) Caracal (*Caracal caracal*)

Most of the available literature is not site-specific, distribution being indicated very broadly and that too, as it occurred may be over fifty years ago. Since then there have been sea changes, even at landscape levels. For a better comprehension of existing status of these cats and to pinpoint localities of their occurrence, detailed survey was thus, essential.

SURVEY AND DATA VALIDATION

Most of us have only rudimentary knowledge of Felidae taxonomy and therefore, to facilitate correct identification of cats, extracts of Prater's (1980) work were circulated to the field staff, initially in the tiger reserve and then subsequently to all protected areas in the state. Range Forest Officers were asked to interact with tribals on the subject and provide feedback on the existence or otherwise of the cat species in their respective areas. For authentication

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of information, collections available with the Bombay Natural History Society and regional office of the Zoological Survey of India were examined for comparison. Following is the gist of information on the status of the "smaller cats" in Maharashtra.

JUNGLE CAT (*Felis chaus*)

Bombay Natural History Society's collection includes five specimens of Jungle cat collected from Satara (1912), Thane (1917), Nasik (1943), Ambarnath, Thane district (1948) and Raipur, Amaravati district (1951). Collection from districts Amravati and Thane are labelled as *F.c.* Kutas Pearson, which according to Morrison (1951) are expected from Kutch to Bengal. Other collections are indicated as *F.c.* Prateri Pocock.

The author has sighted Jungle cats in Nasik, Jalgaon, Pune, Satara, Sangli, Kolhapur, Shule, Amravati, Yeotmal, Nagpur, Chandrapur and Gadchiroli districts. Feedback from the field staff indicates the presence of Jungle cat in all the protected areas of the state (Fig. 1). Unfortunately there seemed to be tendency to call all small cats and even civets, "jungly cat" or *Felis chaus*. All these cats, being nocturnal, normally offer only fleeting glimpses.

The state level status of the Jungle cat is in conformity with its population status accorded at global level. As this cat does well even in cultivated landscapes (Nowell and Jackson, 1996), there is no immediate threat to its existence. However, there is need to conduct studies to know more about it.

DESERT CAT (*Felis silvestris lybica*)

There were no reports of this cat by the field staff. However, a cat specimen received during 1990-91 at Semadoh, Melghat as Jungle cat, on

closer examination by the author, showed characteristics of a Desert cat. The specimen was probably hit by a speeding vehicle on the highway but nevertheless, its pelt was not much damaged and so was removed and treated locally, for preservation. The cat was rather squattish and had faint spots and patterns, unlike that of Jungle cat.

Prater (1980) and Morrisson (1951) suggest occurrence of this cat in western and central India and therefore, is expected in drier parts of the eastern and central Maharashtra. Melghat has predominantly dry deciduous teak forests and used to have corridors to drier parts of south-western Madhya Pradesh and then onwards to the scrub forests of Rajasthan.

The cat has been reported from Pench district, Nagpur and Tadoba, district Chandrapur (Personal communications by Dr Pradhan of Zoological Survey of India, Pune). It has been also reported from drier parts of the Pune district namely Shirur, Baramati and Indapur talukas (Fig. 1).

The earlier nomenclature of *Felis lybica*, it appears, is incorrect and the Desert cat of central India has now been designated *Felis silvestris ornata* Gray, 1830. A critical study of local specimen by taxonomist is called for.

Hardly any work has been reported on Desert cat from this state during the recent period and whatever information on record, is too sketchy.

LEOPARD CAT (*Prionailurus bengalensis*)

True to its common name, its close affinity to the leopard is in its yellowish brown colour, and its dark coloured solid spots (but not rosette type). This gives the cat a distinct appearance.

Fig. 1. Smaller Cats of Maharashtra

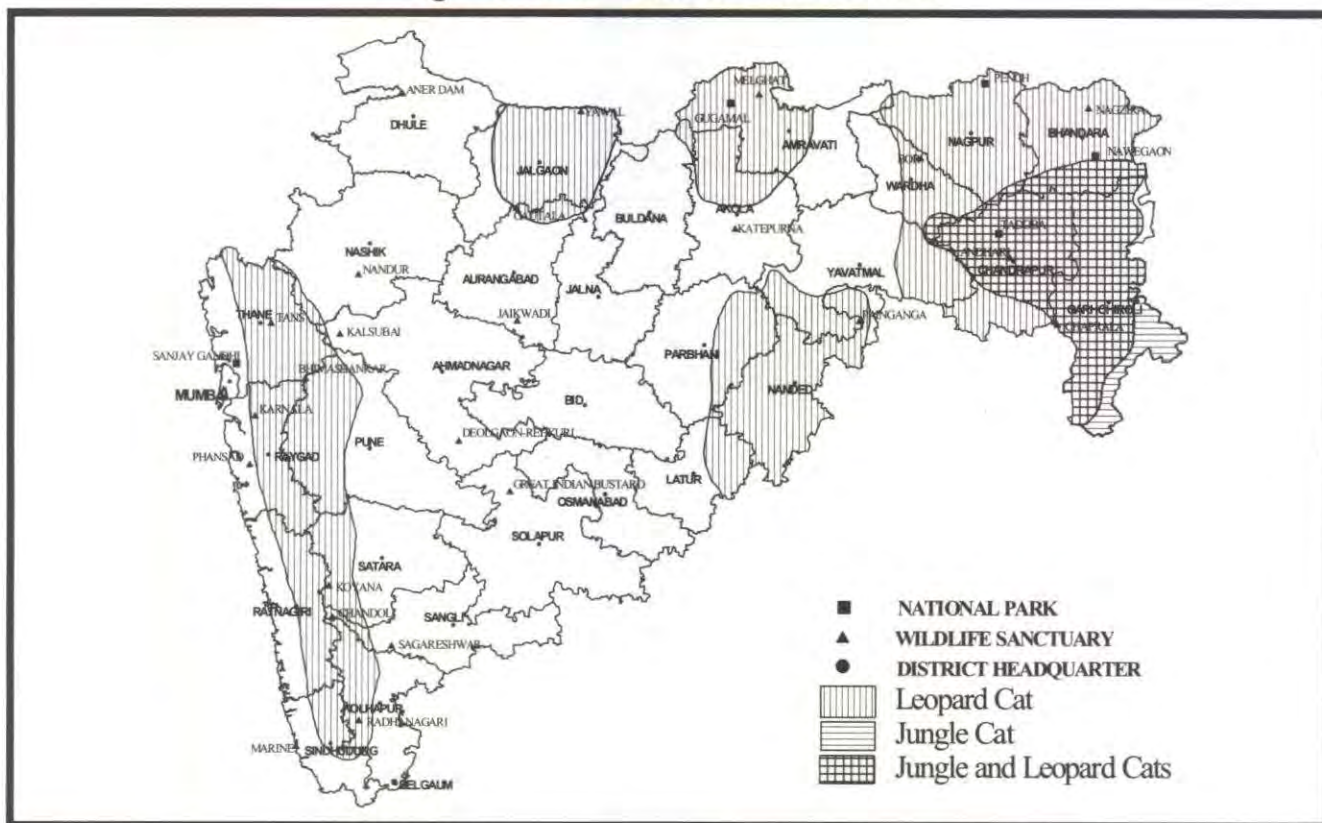
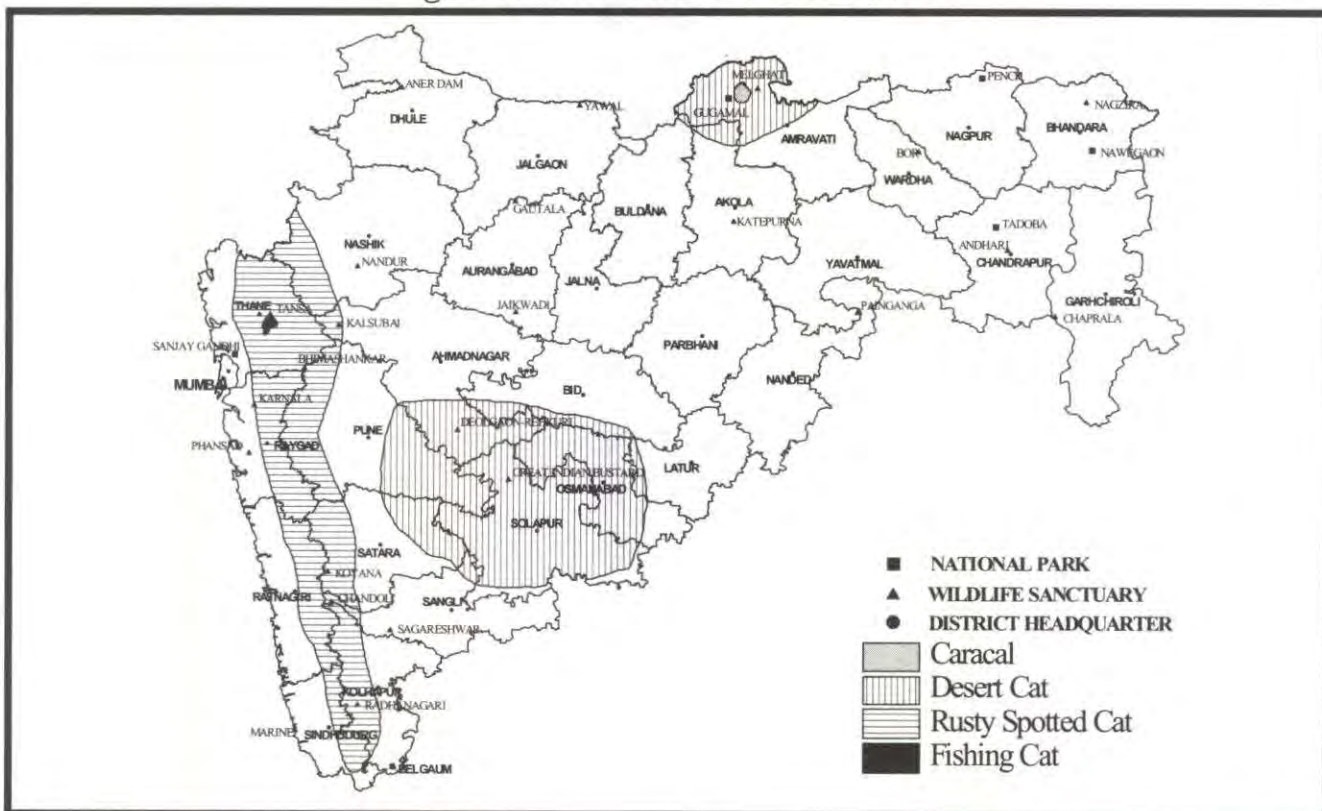


Fig. 2. Smaller Cats of Maharashtra



Note: The maps have been retouched for reprinting

The smaller cats of India and their distribution



The most common of small cats
in India

Jungle cat (*Felis chaus*)

Biogeographic zones - 2A, 2B, 2C,
2D, 3A, 4A, 4B, 5A, 5B, 6A, 6B,
6C, 6D, 6E, 7A, 7B

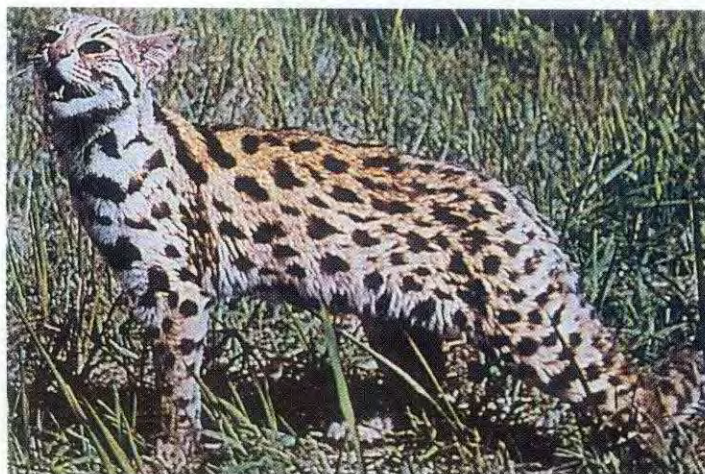
Closely resembling the house cat
Desert cat (*Felis silvestris ornata*)
Biogeographic zones - 3A, 3B, 6D*, 6A*



A denizen of the drier regions in India

Caracal (*Caracal caracal*)

Biogeographic zones - 3A, 3B, 4B, 6A, 6D



Spots and rosettes like that
of a leopard

Leopard cat (*Prionailurus bengalensis*)

Biogeographic zones - 2A, 2B, 2C,
2D, 4B, 5A, 5B, 6A, 6B, 6C, 6D,
6E, 7A, 7B, 9A, 9B



A diet consisting mainly of fish

Fishing cat

(*Prionailurus viverrinus*)

Biogeographic zones - 2B, 2C, 4B,
5A, 5B, 6A, 6B, 6C, 6D, 6E, 7A, 7B,
9A, 9B



In India, found in the far north
Eurasian Lynx (*Lynx lynx*)
Biogeographic zones - 1A, 1B



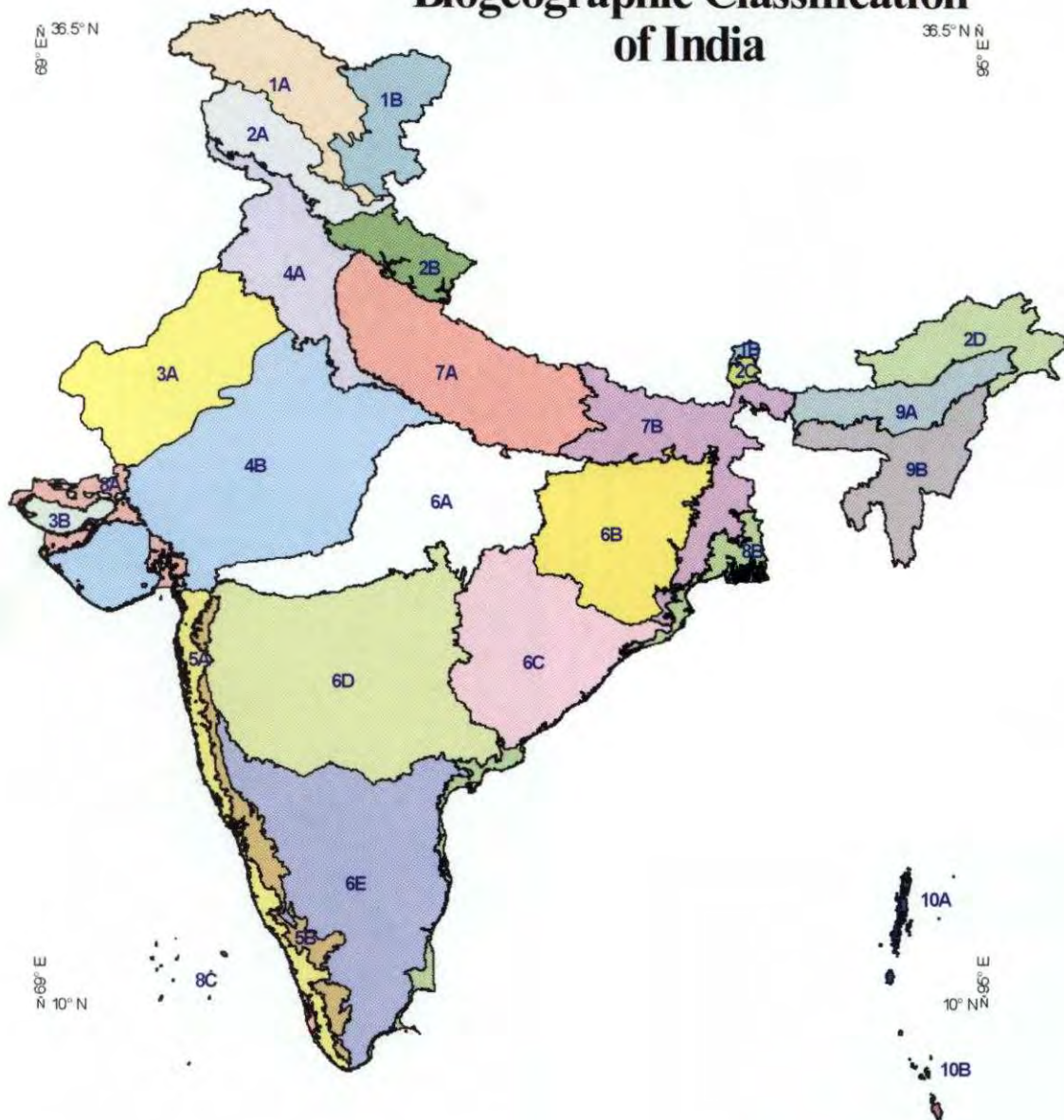
Adapted to living in open habitat

Pallas cat or Manul

(*Otocolobus manul*)

Biogeographic zones - 1A, 1B

Biogeographic Classification of India



- 1A: Trans-Himalaya-Ladakh Mtns.
- 1B: Trans-Himalaya-Tibetan Plateau
- 2A: Himalaya-North-West Himalaya
- 2B: Himalaya-West Himalaya
- 2C: Himalaya-Central Himalaya
- 2D: Himalaya-East Himalaya
- 3A: Desert-Thar
- 3B: Desert-Katchchh
- 4A: Semi-Arid-Punjab Plains
- 4B: Semi-Arid-Gujarat Rajputana
- 5A: Western Ghats-Malabar Plains
- 5B: Western Ghats-Western Ghats Mtns.
- 6A: Deccan Peninsula-Central Highlands

- 6B: Deccan Peninsula-Chotta-Nagpur
- 6C: Deccan Peninsula-Eastern Highlands
- 6D: Deccan Peninsula-Central Plateau
- 6E: Deccan Peninsula-Deccan South
- 7A: Gangetic Plain-Upper Gangetic Plain
- 7B: Gangetic Plain-Lower Gangetic Plain
- 8A: Coasts-West Coast
- 8B: Coasts-East Coast
- 8C: Coasts-Lakshadweep
- 9A: North-East-Brahmaputra Valley
- 9B: North-East-North-East Hills
- 10A: Islands-Andamans
- 10B: Islands-Nicobars



0

1000 Km

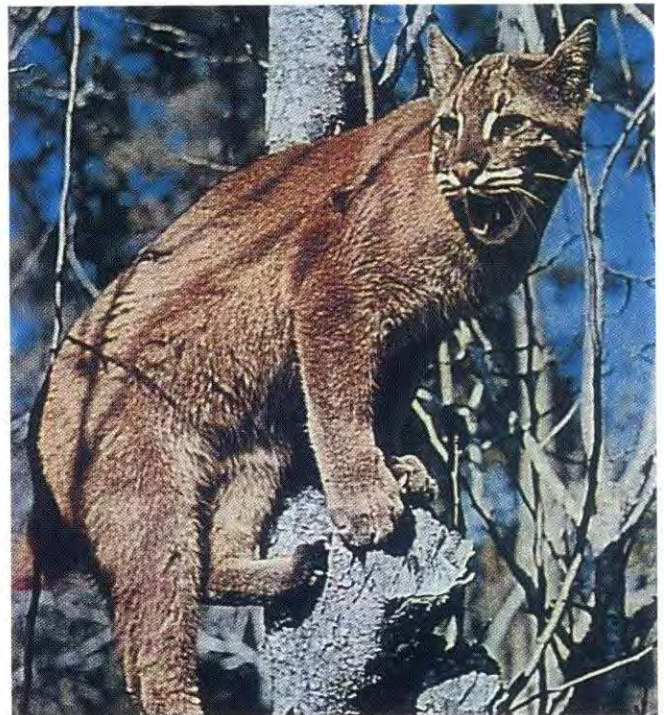


भारतीय वन्यजीव संस्थान
Wildlife Institute of India

The smallest of the cat family
Rusty spotted cat
(*Prionailurus rubiginosus*)
Biogeographic zones - 2A*, 2D*, 4A,
4B, 5A, 5B, 6A, 6C, 6D, 6E



This cat has a distinct coat pattern
Clouded leopard (*Neofelis nebulosa*)
Biogeographic zones - 2C, 2D, 9A, 9B



An oriental cat
Golden cat (*Catopuma temmincki*)
Biogeographic zones - 2C, 2D, 9A, 9B

Akin to Leopard cat but smaller
Marbled cat
(*Pardofelis marmorata*)
Biogeographic zones - 2C, 2D, 9A, 9B



Though this cat is reported to have a wide range of distribution, authentic reports on its occurrence within the state at present seem to suggest its restriction to the eastern region. Game wardens of Chandrapur (Chaprara and Tadoba), Wardha and Nagpur districts have indicated presence of this cat in their respective protected areas (Fig. 2). The information was checked for validation.

There have been previous reports of Leopard cat occurrence in erstwhile Bombay Presidency and thus its occurrence is expected in coastal and Western Ghat areas, but so far, there has been no report from this region.

RUSTY SPOTTED CAT

(*Prionailurus rubiginosus*)

This smallest of the smaller cats, the Rusty spotted or rather "chocolate (coloured) spotted" cat, is very lovely in its appearance. However, its small size, and arboreal and nocturnal habit, make its sighting very difficult.

The earlier reported distribution of this cat is western and south-central Asia (Prater, 1980; Morrison, 1951, etc.). However, area specific information during recent times has been from the Dang forests situated very close to the north-western part of the Maharashtra state. There are old reports from Khandala in Pune district. Recently some cats were seized from culprits in Murbad Range of Thane district, and then transferred to Sanjay Gandhi national park, Borivili, Mumbai (Fig. 2). One of the cats has been duly preserved and is available for examination with the Veterinary Officer, Dr Barahate.

Ex-Field Director, Project Tiger, P.J. Thosare, the then Field Director of Melghat tiger reserve, reported the presence of this cat in Melghat, in 1994. This claim has been confirmed

by senior officials like S/Shri Sharma and Jagir Singh (Wankhede, 1996).

CARACAL (*Caracal caracal*)

Caracal was considered a special component of the drier savannah and thus it surprised many when Dr MK Ranjitsinh, the then Director (Wildlife), Government of India, during his visit to the Melghat tiger reserve in 1986 suggested its presence in the region. Enquiries initiated thereafter revealed that Korku, the tribal inhabitants of Melghat have a local name "bada manu" for the cat and there was no mistake in its identification, as large sized tufted ears were recognised by Korkus when photographs were shown.

Shri Thosare very clearly observed in Dhakana Range, a Caracal attempting to catch birds. Circumstantial evidences like scratch on the tree boles, also support the claim. A second sighting has been reported from Ghatang Range in Melghat by the present Field Director, VT Patki (Wankhede, 1996).

FISHING CAT (*Prionailurus viverrinus*)

Literature review had not indicated presence of this cat within the state boundaries (Prater, 1980; Sanyal and Roy, 1986). However, a wildlife warden working in Tansa sanctuary, Thane district, reported its presence (Fig. 2). The cat's appearance is similar to civet and its habitat is specific.

The Tansa sanctuary encompasses a well protected large waterbody which supplies water to the Mumbai city. This area, till recently, had corridors to the coastal region and thus the claim seems to be reasonable and needs to be further investigated. There is a possibility of Jungle cat getting mistaken for Fishing cat as it also prefers to be in proximity of water

courses and may even indulge in catching fish.

DISCUSSION

Typical habitats of all cats expected to occur in Maharashtra have been covered and a network of protected areas covering major bio-geographical zones, has already been established. Though major emphasis of management of protected areas is on the more glamorous major cats and herbivores i.e, tiger, leopard, Indian gaur, sambar, cheetal, etc., the smaller cats are also being benefitted.

Most of the smaller cats enjoy legal protection. However, in the absence of concerted conservation efforts, they are not likely to receive protection in the real sense.

Many of the rare smaller cats could be confused with domestic cat and therefore, their hunting may not even be taken cognisance of. Taxonomical studies are therefore essential.

Protection of the habitat alone is not sufficient for comprehensive gene pool conservation efforts to cover the lesser cats. Being very versatile, most of them are able to survive even outside high forests and can easily take to areas on the fringes of human habitations and sometimes even within the human habitations. Their survival is not as much jeopardised as that of the major cats in the proximity of human habitations such as the tiger. However, indiscriminate use of pesticides has already taken a heavy toll of their prey base which comprises predominantly smaller mammals, mainly rodents, and even small birds.

Nocturnal and arboreal habits of these cats make their presence difficult to locate. It is also difficult to carry out a survey of Fishing cats

because of the specific habitat which it enjoys. Approaches like use of camera traps are therefore essential for conducting thorough surveys.

Protected area managers should pay more attention to these interesting cats and generate a much needed database on their status and ecology so that conservation efforts are made in right direction.

ACKNOWLEDGEMENT

Unstinted support provided by the field staff of Melghat tiger reserve is acknowledged. Thanks are also due to protected area managers in the State who responded positively to enquires made from time to time. Dr Pradhan and his colleagues at Zoological Survey of India provided the much needed library support.

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Rearing leopard cat cubs in a zoo

Dr MK Shiva Shanker

ON 26 MARCH 1995, a pair of Leopard cat cubs (*Prionailurus bengalensis*) was handed over to the Himalayan zoological park, in Gangtok (Sikkim). The cubs, one male and one female, were found abandoned near a stream at Tadong (Gangtok). The cubs were approximately two months old.

HOUSING

At the zoo, as the construction of exhibit enclosure was yet to be completed, the cubs were kept in a small iron cage 6.25 x 5 x 4 ft. Inside, a small hollow tree trunk was placed and planks were laid for bedding purposes. The cage was covered with non-transparent plastic sheets for darkness and to protect the cubs from sunlight and rain.

With the completion of the exhibit enclosure, the cubs were subsequently released there in October 1997. The exhibit enclosure comprises an open yard with two feeding compartments. The perimeters of the enclosure are bounded by GI wire mesh, with GI sheets on top to prevent the animals from escaping. Inside, hollow tree trunks have been placed on the ground at different levels. Visitor galleries are provided around the fence to avoid stress to the animals.

FEEDING

The cubs were fed on a daily diet as follows :

Time	Food
7.00 am	Milk
10.00 am	Egg
4.00 pm	Beef

This diet was supplemented with vitamins and minerals such as Dsteo-calcium suspension and Syrup B-complex.

During the daytime, the cubs hid in the hollow tree trunk and came out only for defecation. They were found to be more playful and active in the evenings.

MANAGEMENT

The feeding shelters are cleaned daily. The leftovers of the feed are collected for disposal. The entry of the animal caretaker to the exhibit enclosure is kept to the minimum so as to avoid stress and disturbance to the animals. The behaviour and health of the animals is observed and noted daily. Faecal samples are collected monthly for examination of any endoparasitic infestation.

The exhibit enclosure provides a natural habitat to the Leopard cats, where they regularly prey on small birds and rodents. The animals have apparently grown. Being nocturnal, the animals are difficult to observe, but it is expected they will breed in the near future.

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Status of small cats in zoos

Tables 1 & 2

Table 1
Zoos with small cat species in captivity

Zoo/Compiler/ Date	Desert cat	Fishing cat	Golden cat	Jungle cat	Leopard cat
Himalayan Zoological Park, Bulbuley, Gangtok/ SD Pulger, Joint Director/ 14 July 1998	-	-	-	-	Yes
Assam State Zoo Guwahati, Assam/ Forest Vety. Officer/ 1 July 1998	-	Yes	Yes	Yes	Yes
Zoological Park Arunachal Pradesh/ Dr BK Gogoi Vety. Asst. Surgeon/ 18 July 1998	-	-	-	-	Yes
Manipur Zoological Garden Imphal, Manipur/ Aditya Joshi, DCF/ 27 July 1998	-	-	Yes	Yes	Yes
Miao Mini Zoo Miao, Arunachal Pradesh/ Gopalkumar C (FR)/ 7 April 1998	Yes	-	-	-	Yes

Note: The following zoos also responded but had no small cat species - Bondla Zoo, Panaji, Goa (VT Thomas, DyCF); Tata Steel Zoological Park, Jamshedpur, Bihar (MS Jain, Director); and Rajkot Zoo, Rajkot, Gujarat (Dr MG Maradia, Zoo Superintendent).

Status contd.

Table 2
Status of small cats in zoos

Species/ zoo	Nos.	Date/place of procurement	Whether breeding	Other information
LEOPARD CAT				
Himalayan Zoological Park	1 (M) 1 (F)	26/3/95 Tadong, Gangtok	No	-
Zoological Park Itanagar	1 (M) 2 (F)	26/6/95 Confiscated from circus 10/10/92; 11/6/96 Porral	No	-
Manipur Zoological Garden	8	6/9/91; 5/12/96; 3/2/98; 2/5/98 Churchandpur, Senapati & Imphal dists.	No	Reared from cubs
Miao Mini Zoo	2 (M) 1 (F)	10/6/83; 1/1/97 12/12/97 Namdapha, Mehao WL Dvn & Kamlang WL Dvn	No	Captive breeding being tried
FISHING CAT				
Assam State Zoo	1 (M)	12/16/94 Karimganj	No	-
GOLDEN CAT				
Assam State Zoo	1 (M)	22/4/89 Supplier	No	-
Manipur Zoological Garden	1 (F)	5/10/96 Miao(Senapati dist.)	No	Colour black
JUNGLE CAT				
Assam State Zoo	1 (M)	3/4/94 Nowgaon	No	-
Manipur Zoological Garden	2	8/7/87 Imphal dist.	No	-

The smaller cats get less

Baiju Sanyal

THERE WERE TIMES not long ago that Jungle cat, Leopard cat, Fishing cat, Marbled cat, etc. were abundant in the wild. And although these spotted or striped, small to medium sized cats are distributed almost all over India including the upper reaches of the Himalaya and the deserts, they are much sought after for their priceless fur, prized in the west as a status symbol, with India being a major source country. Due to the resultant hunting and extensive poaching, alongwith habitat loss, today their numbers have dwindled drastically.

The threat to the small cats have greatly been ignored especially as

compared to their bigger cousins, the tiger and the leopard. Species like the Desert cat, Fishing cat, Leopard cat, Rusty Spotted cat, etc. are listed in Schedule I of the Indian Wildlife (Protection) Act, 1972 and Appendices I & II of the CITES (see Table I) which entails that highest conservation effort be made to save them. Yet, apart from some minor enforcement successes, these animals still struggle to survive.

The story behind the decline of these cats only goes to show how a weak implementation of the law can undermine the protection of these creatures, already endangered or

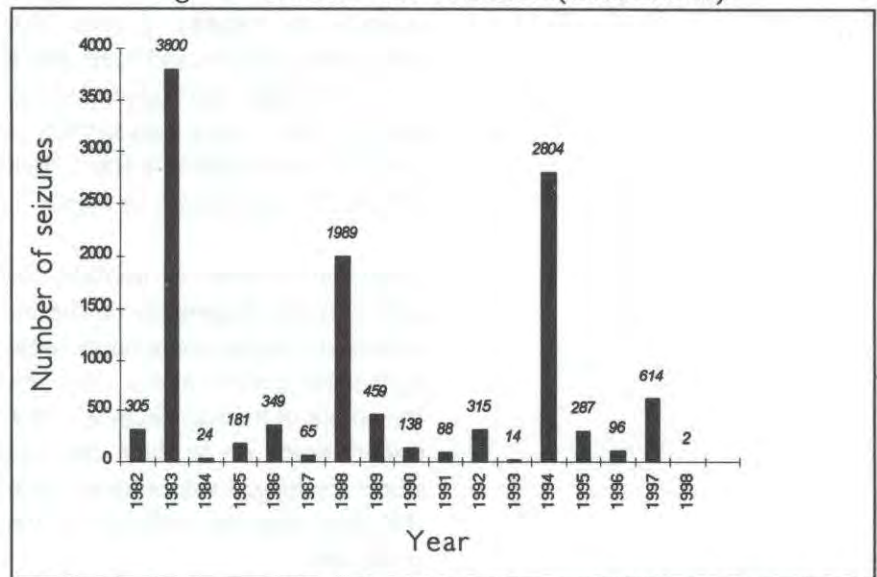
Table I

Species	CITES	Indian Wildlife (P) Act Schedule	IUCN Red Data Book*	J&K Wildlife (P) Act Schedule
Lynx (<i>Lynx lynx</i>)	II	I	E	I
Jungle cat (<i>Felis chaus</i>)	II	II	-	-
Leopard Cat (<i>Prionailurus bengalensis</i>)	I	I	V	I
Fishing cat (<i>Prionailurus viverrinus</i>)	I	I	V	I
Marbled cat (<i>Pardofelis marmorata</i>)	I	I	E	I
Golden cat (<i>Catopuma temmincki</i>)	I	I	E	I
Rusty spotted cat (<i>Prionailurus rubiginosus</i>)	I	I	E	I
Caracal (<i>Caracal caracal</i>)	I	I	E	I
Desert cat (<i>Felis silvestris ornata</i>)	II	I	E	IV
Pallas cat (<i>Otocolobus manul</i>)	II	I	IK	I

* E - Endangered; V- Vulnerable; IK- Insufficiently known

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New Delhi

Fig 1 - Smaller cat seizures (1982-1998)



Note : The year-to-year variation in data is because there is no formal data collection mechanism for wildlife crimes.

vulnerable. Trade in the skins of small cats is deeply entrenched, as the poachers are not being strictly brought to book, with the result that there are repeat offences.

From the trade data gathered by the Wildlife Preservation Society of India on illegal trade of small cats, it has been noted that the most vulnerable are the Jungle cat, Leopard cat and Fishing cat which together account for about 90% of the total small cat seizures since 1979. On the basis of poaching and trade data collected from Delhi, Uttar Pradesh, West Bengal, Orissa and other states, Fig. 1 shows the small cat seizures made in the last 16 years. Some of the vital seizures have been as follows:

(a) About 3000 Jungle cat skins and 400 Desert cat skins - Delhi, 1983;

(b) 1200 Jungle cat and 700 Desert cat skins - Delhi, 1988;

(c) About 2000 Jungle cat skins - Railway station in Jammu & Kashmir and Pathankot (Punjab), 1994;

(d) About 400 coats made from Desert cat - Srinagar, 1995;

(e) About 200 Desert cat skins - Puri (Orissa), 1995; and

(f) Over 200 Jungle cat and Leopard cat skins - 1997.

Besides the above, a lot of seizures have been made of products such as coats, footwears, gloves and other garments which utilise a substantial amount of these cat skins. For instance, the number of skins required to make a full-length coat may be 40-50 in the case of a species like the Rusty spotted cat.

In Jammu & Kashmir, skins and fur are important trade products. The state has its own Wildlife (Protection) Act, 1978 (see **Note** below) wherein many of the provisions of the Indian Wildlife (Protection) Act, 1972 have been diluted. Poaching in smaller cats continues unabated in other states as well, e.g. West Bengal, Assam, Rajasthan, UP and Maharashtra, with protected areas facing threat from poachers and trappers, nomadic hunting tribes and pelt dealers.

The skins and products are smuggled initially to nearby places like Kathmandu (Nepal) and from there on to the West, particularly Europe and the USA. In fact, with Kashmir in unrest, many Kashmiri traders have shifted their operations to Nepal.

Since the commercial demand for pelt is mainly dependent on the international market, there needs to be rigid trade control and a strict enforcement of the law. Because, if the traders hold on to their declared stocks for long, it will become more difficult to stop the onslaught on the small cats.

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Note :

The Jammu & Kashmir Wildlife (Protection) Act, 1978 is largely similar to the Indian Wildlife (Protection) Act,

1972 except that it does not carry the amendments of 1986 and 1991. As a result, the threatened status of a large number of commonly traded species for fur and pelts such as Desert cat, Red fox, Desert fox, etc., is not properly reflected. Common leopard; and Tibetan Antelope are listed under Schedule II in the state Act, whereas these are in Schedule I of the central Act. and in Appendix I of CITES. Noteworthy is the complete exclusion of the Jungle cat, one of the most common species in fur trade, from the list. Trade in the other above mentioned species is permitted under Section 8 of the Jammu & Kashmir Wildlife (P) Act for which a "Special game hunting license" need only be obtained. When the Act came into force, all traders possessing any Schedule I or Schedule II, Part II animal had to declare it and were allowed to export fur and garments out of their declared stock. This led to traders increasing their stock by obtaining "procurement certificates" and also illegally recycling their existing stock. Due to poor implementation of the Act, the permits issued for exports far exceeded the declared stock.

Some methods to study the small cats

Shomita Mukherjee

ONE OF THE MAIN reasons for studying the behaviour and ecology of rare and endangered animals is to find new and better ways to conserve them. Since habitat and food are two of the most important resources for animals, it follows that information on these need to be obtained for planning any management strategy. Based on such basic information more detailed studies can be then planned.

TO DETERMINE STATUS

The secretive, solitary and nocturnal habits of small cats make them very difficult to study. Obtaining direct sightings is not easy and so one has to largely rely on indirect evidences of their presence, such as tracks or scats (faeces). Since it is neither possible, nor necessary, to obtain total numbers for determining the status of a species, regular estimates and trends of use of a habitat by the species

would suffice. This can be done by both direct and indirect means.

DIRECT METHODS : These rely on animal sightings, hence for felids that are nocturnal, the time for locating them should be around dusk, dawn and night. Methods for obtaining direct sightings can involve random walks, walks on trails and roads, and vehicle drives through the network of roads in the area. Data-sheet may be prepared, separately for foot and drive counts (see Table I for example).

It is important to note the approximate total distance travelled per search, as the abundance of species can be expressed as encounter rates per kilometre (i.e. sum up all sightings obtained of each species in each habitat and divide by the total distance travelled in that habitat). This data-sheet can be made separately for each month so as to obtain a pattern

Table I
Foot counts for the month of August 1998

Date & Time of sighting	Area (Habitat)	Species	Nos.	Activity	Total distance covered	Time spent in habitat
120898 2000hr	Scrub. (kachha road)	Jungle cat	1	Walking	2 km	2.5 hrs 1900-2130hr
130898 2200hr	Wetland. (main road)	Fishing cat	2	Resting	3 km	2.5 hrs 2100-2330hr
130898 2300hr	Wetland (main road)	Jungle cat	1	Walking		

of habitat use through the year. The search effort timings - night and day - can give the time of activity in the various habitats which can be compared and correlated to several other factors e.g. disturbance from human activity, presence of other carnivores, prey habits, etc. All other information such as number of kittens (if any), their approximate age, etc. should also be noted.

INDIRECT METHODS : Several evidences left behind by an animal can be used for estimating its relative abundance.

Scat counts - As with direct sightings, special efforts can be made to locate scats (droppings) of animals along main and dirt roads. Data-sheets can be prepared to record area, distance travelled and number of scats found, of each species, in that habitat. The total number of scats located divided by distance travelled will give encounter rates for scats of each species in different habitats, which can be compared. One way of avoiding recounting scats is to walk any trail or road just once and record locations of scats along it without collecting them.

Scats can provide information on the food habits of the species. But, as scats are used for marking territories and as means of communication between individuals of a species, there is a possibility that collecting all scats may disturb the animals. As such, there should be only limited collection which can be done for a month in each season over a period of one year and repeated on alternate years. However, one major problem with this method lies in the identification of scats of different carnivores, particularly in areas which have a large number of similar sized and related carnivores such as in north-east India.

monitored systematically over a long period in different habitats can give substantial information on use of a habitat by a particular species. Tracks can be obtained on patches of area cleared of vegetation, over which a thin layer of soft soil is sprinkled. Many such plots can be laid in a habitat, spaced out at regular intervals (e.g. 500m.). These plots can be laid adjacent to dirt tracts and animal trails as well as away from these. This method is more feasible in the drier areas with plenty of loose soft soil, although several modifications may be made for other areas, e.g. using metal sheets with a fine layer of carbon collected by smoking it over a candle. These sheets can be placed as track plots at regular intervals in various habitats.

Other area specific methods can be designed to minimize problems specific to the area. The location of these plots may be permanent or changed regularly. Data should be recorded every morning and the track plots set up again. However, since animals take some time to adjust to any new feature in their surroundings, the first few days after plots are set up may not yield results. Results of track plots are expressed as percentage visitation to plots in a habitat by a species:

$$\frac{\text{Number of plots with signs}}{\text{Total number of plots}} \times 100$$

If an area has more than one species of similar sized cat, their tracks would be difficult to distinguish and there would be a problem of evaluating relative abundance through tracks. In such a case, the results can be interpreted for small cats as a group i.e. areas of high cat use can be identified. Of course, this would give much less information but it would still be valuable for conservation purposes.

Track counts - Tracks of animals, One way to get around the problem

Rules & Precautions

- * Take due permission of the forest department before collecting anything from field or prior to any trapping exercise.
 - * Wear gloves for collecting scats to prevent transmission of dangerous parasites present in scats
 - * Wear gloves and mask over mouth and nostrils while analyzing scats; or while handling rodents as some dangerous viral diseases can be transmitted through them.
 - * Laboratories or rooms where scats are analyzed should be well ventilated.
 - * Prevent rodent faeces and urine from touching any part of your body.
-

of track identification is to use camera traps (a camera attached to a pressure pad or an infra-red device which triggers the camera as the animal steps on the pressure pad or moves across the infra-red beam. In effect, the animal photographs itself!).

These traps may be placed around areas and on paths that are intensively used by cats (i.e. areas where track plots show lots of cat tracks). The photograph will reveal the identity of the cat species and the measurements of the tracks may show differences (if there are any) with other cat tracks. However, this will be possible over a longer time period when a range of track measurements can be obtained for different species in that area.

One important factor to be noted is that "status" is a relative term, hence if a cat e.g. Jungle cat, is recorded as common in an area, this should be relative to other areas where the cat is found or to other cats found in that area, and must be stated as such. Without a systematic approach to obtain relative abundance, conclusions on status can be erroneous. Loose usage of such terms can cause damage to the species concerned.

It is advisable to use both, direct and indirect methods for more reliable conclusions.

TO STUDY CAT FOOD HABITS

As mentioned earlier, from direct observations of cats, only anecdotal records can be obtained after much effort which is not enough to describe the food habits of a species. Hence indirect methods have to be used to get reliable estimates of their diet.

Since scats contain all the undigested remains, these can give valuable information on the diet of predators.

The scats should be teased apart and the remains of different groups of prey (mammals, birds, reptiles, invertebrates and vegetable matter) separated. Most mammalian remains can be identified to the species level by examination of hair and other remains such as jaws and dentition (usually of rodents or insectivores such as shrews).

The results can be interpreted as simple presence/absence of species, given as percentage of scats having a particular prey species or as biomass consumed. For the latter, an idea of the body weight of the prey as well as the number of individuals of that prey species consumed is necessary. Body weight of most rodents, shrews, reptiles and birds are available from literature. The keys for the identification of the prey remains (feathers for birds, scales for reptiles, mouth parts and other body parts for invertebrates) should be prepared whenever possible.

Rodents can be identified to the species level from their dentition, as the biomass calculations are applicable to this group alone. For this, however, it is necessary first to establish a checklist of the species present in the area and sacrifice a few rodents to obtain their jaws for dentition patterns. Once the dentition found in scats are identified and the number of whole jaws counted, biomass of each rodent species consumed can be obtained by simply multiplying the number of individuals of that species eaten with its average body mass.

A comparison of diets of various carnivores can be made only if scats are properly identified. However, even if scats of all small carnivores in an area are pooled, valuable information on the diet of this community as a whole can be obtained. Diet can be

compared over seasons and different habitats. Such information is not available for most places in India and would be very useful for future studies and conservation of small carnivores.

Knowledge of availability of prey species in different habitats within an area can be compared to consumption. This would refine a study by giving probable reasons for diet changes (if any) between seasons and habitats as well as an idea of the preferred prey.

TO DETERMINE PREY ABUNDANCE

Since the prey species of the small carnivores belong to several groups (mammals, ground birds, other birds, reptiles, invertebrates), more than one method is usually required to cover all these. An initial pilot study of scats in each season can give an idea of the main food species for that period, and abundance estimates can be restricted to those groups in case time is a constraint.

For mammals such as hare, and ground birds such as peafowl, partridges and quails, track plots used for monitoring predator abundance can be used for prey as well. For rodents, standard methods are available which make use of live-traps. Several such traps (100-200) baited with some food (preferably peanut butter) can be set up in each habitat in a grid, with each trap at a fixed interval from the next (10m or as desired), e.g.:

■	■	■	■	■
■	■	■	■	■
■	■	■	■	■

Traps should be left in the place for a minimum of 3-4 days and nights. They should be shut for the day to avoid capture of birds and other unwanted species or should be checked regularly at 5-6 hourly intervals during the day (especially during

summer) to avoid unnecessary death of captured animals. Baits should be renewed every evening and night. Total trap nights would be the total number of traps multiplied by the number of days. Hence if there are 100 traps in a grid kept for 5 days/nights then the total trap effort would be 500 trap days/nights. Results can be interpreted as percent trapping success of a species in a habitat i.e. $\frac{\text{Number of catches made}}{\text{Trap effort}} \times 100$.

Trap effort

Food consumed can then be compared to availability in each habitat and preferences, if any, obtained.

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